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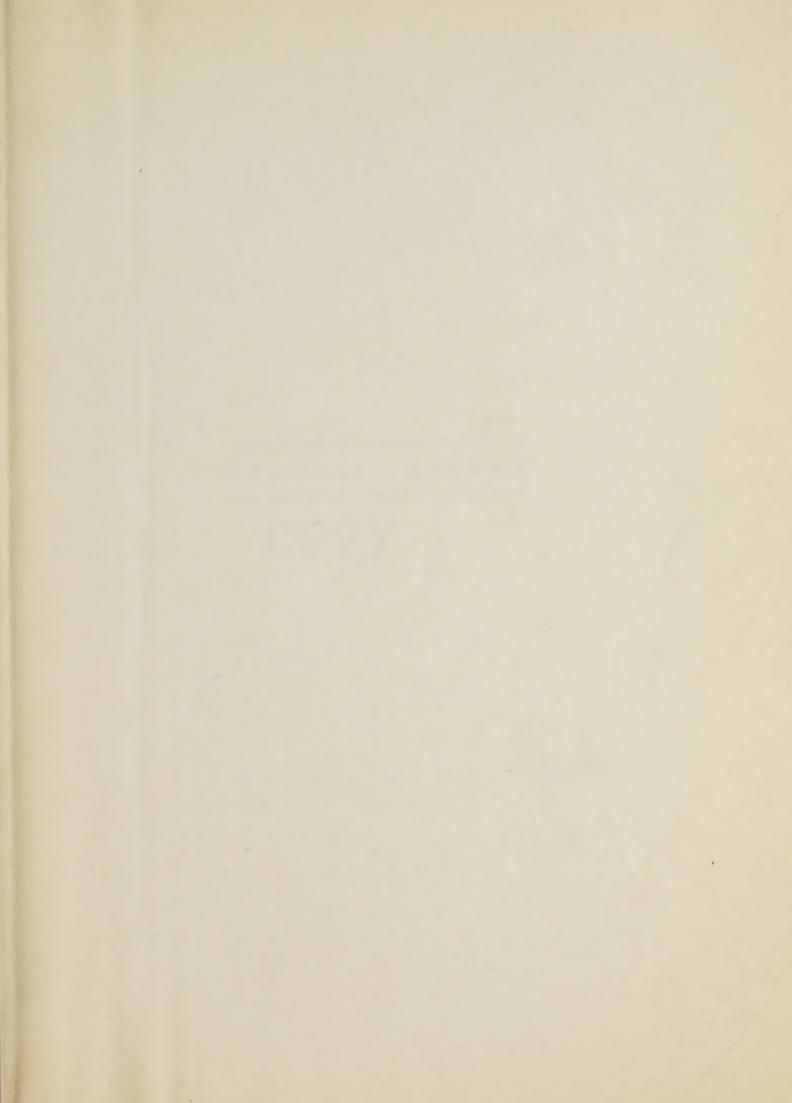
HYDRO-ELECTRIC INQUIRY COMMISSION

GENERAL REPORT

NIAGARA SYSTEM.

JOSEPH H. W. BOWER
SECRETARY





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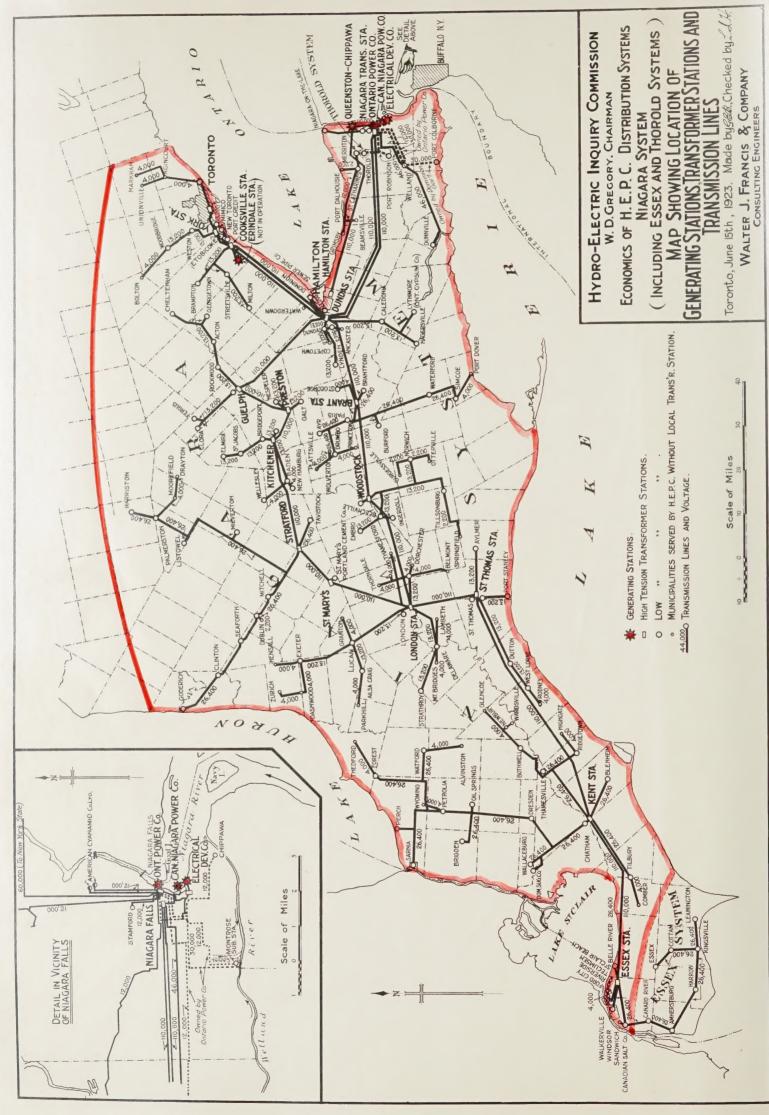
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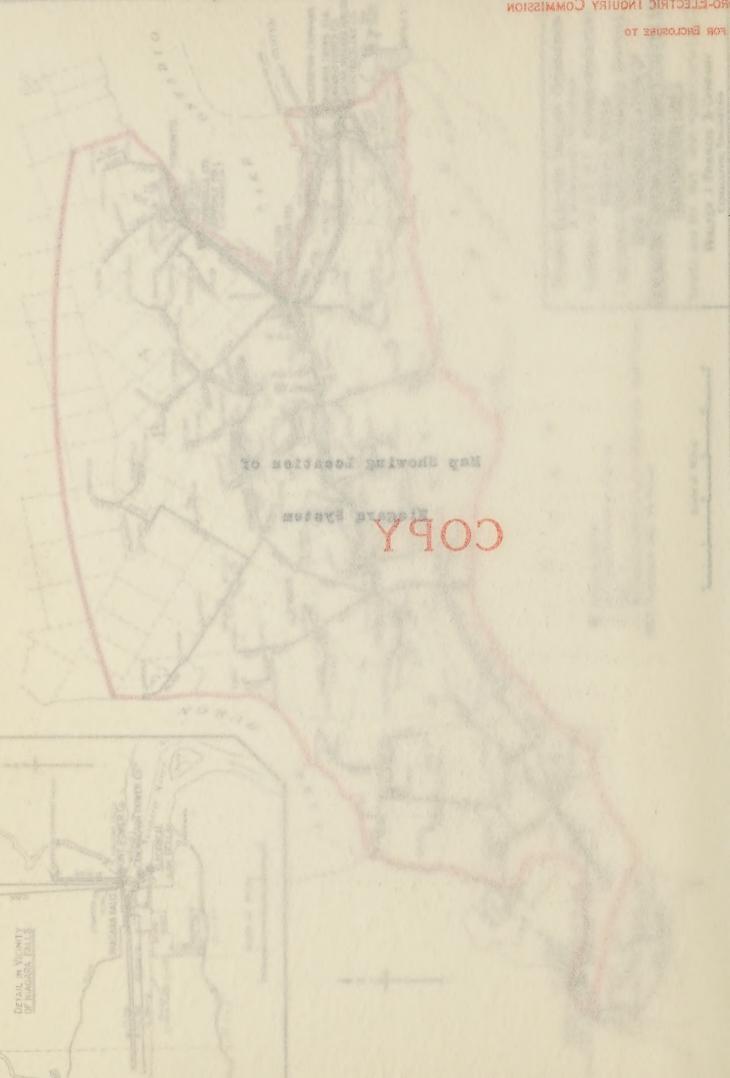




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Toronto, Ontario. September 25th, 1 9 2 3

Hydro-Electric Inquiry Commission, W. D. Gregory, Esq., Chairman, Toronto - Ontario.

re: General Report - Miagara Bystom

Mr. Chairman and Gentlemen:-

In accordance with your instructions a general report on the Miagara Dystem has been made along the lines approved of by the Commission on January 2nd. The work has been done under my direct personal supervision so per your instructions.

The reports of Messrs. Price, Waterhouse & Company and Messrs. Clarkson, Gordon & Dilworth, together with a report on this system by the Commission's Consulting Engineer, Mr. Walter J. Francis, have been used in the proparation of this report. No public hearing was held in connection with this system.

The first two sections of the document follow closely the same plan as that adopted for other system reports, but in respect to the "Coper I bednomics" of the system it has been deemed advisable to divide this into two distinct parts, namely: Section # 1 and Section # 2. Section # 1 deals only with the operating economics of what may be termed "Hiagara System Proper". and does not include the development plants at Hiagara, which supply electrical energy to the transmission system. Section # 2 of "General Sconomics" deals with what is termed "Greater Riagara System" which for the purpose of this report has been considered to include not only the works of "Niagara System Proper", namely, the transmission lines and distributing stations, but also the generating plants, taking water from the Biagara River. This section comprises pages 54 to 85, inclusive, and is by far the most important section of the report. The subjects discussed therein involve matters of principle and policy, having a decided and far-reaching effect upon the very principles upon which the Power Commission Act is based. Your attention is therefore particularly directed to this section.

All figures used have been carefully checked by a representative of Messra. Frice, Waterhouse & Company. Reports
forming the basis of this report are appended hereto and in order
to facilitate reference to the documents in question on the righthand margin of the report throughout will be found abbreviated
references.

Yours very truly

Jecretary

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NIAGARA: SYSTEM

HISTORICAL SKETCH

of Ontario was appointed in 1906, with power to enter into contracts with municipal and other corporations for the transmission and supply of electric power. Since this date the powers of the Commission have been extended and amended, and its permitted have grown to vast proportions. In 1906, by-laws were passed in a number of cities, towns and villages, authorizing the Corporations and their Gouncils to make contracts with the Commission for a supply of electrical power to be transmitted from Ningara Falls.

93F.

Logislative assembly of the Province of Ontario on April 20th, 1907, the Commission was authorized, under trustee-ship to the municipalities receiving power, to construct generating plants, transformer stations, transmission lines and distributing stations for the purpose of generating, transmissing and distributing power to municipalities in Ontario.

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PROPERTY.

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 Amendment Act. 1909" was passed amending the 1907 Act
referred to above, and validating the agreement dated
May 4th, 1908, between the Commission and the Municipal
Corporations of Toronto, London, Guelph, Stratford,
2t. Thomas, Woodstock, Kitchener, Galt, Hospeler, St.
Mary's, Preston, Saterlee, New Hamburg and Ingersell,
by which the Commission agreed among other things to
construct a line to transmit electrical energy from
Misgara Falls to the Municipal Corporations, and to have
this electrical energy available in the municipalities
on the 19th day of March P1970, in such quantities as
the municipalities had requested.

WJF.

cleatric power companies at Miagara Falls to submit a price on 100,000 electrical horse-power to be delivered to the Commission, the lowest tender was received from The Ontario Power Company of Miagara Falls. A contract was, therefore, entered into between the Commission and the company on March 19th, 1906, for a maximum of 100,000 horse-power to be taken in certain blocks as required. This contract fixed the rate for 12,000-velt power at \$9.40 per horse-power per annum up to 25,000 horse-power, and at \$9.00 per horse-power per annum for all the power when the amount reserved and hold ready for delivery upon the order of the

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TA LONG, NAME AND VALUE OF THE PARTY OF TAXABLE

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 John is sion totalled 25,000 horse-power or more. An additional charge of \$1.00 per horse-power per annum for power delivered at 60,000 volts was agreed upon. The duration of the contract corresponded with the water lease of the company from the Queen Victoria Miagara Falls Park Commission, which was granted for a term of 50 years, commencing April 1st, 1900, with three optional renewal periods of 20 years each, making the total period under the option 110 years extending to April 1st, 2010.

WJF.

Ser.

Power was first delivered to the Misgara System's step-up station from The Ontario Power Company on August 25th, 1110, on on Cotober 11th, 1910, power was officially delivered to Berlin, (now Ritchener), over the 110,000-volt lines between Miagara Salls and Berlin by way of Dundas, Guelph and Preston. During the month of November power was supplied to the Municipalities of Guelph, Woodstock, Preston and Waterloop Lendon, Stratford and Hamilton were consected to the system in December, and on February 24th, 1911, power was first delivered to the Poronte substation. By October, 1911, twenty municipalities and two industrial corporations were supplied by the system, and about 12,000 horse-power was being delivered to the Commission by The Ontario Power Company; in 1912, the power delivered was about 30,000 herse-power; in 1914, 68,000 horse-power: in 1915, 94,000 horse-power was taken by 65

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municipalities and on Harch 25th, 1916, the amount of power, ordered to be held in reserve by The Ontario Fewer Company for the Commission for the supply of the Hiagara System, reached the total of the 100,000 horse-power available under the contract of March 19th, 1908.

DE DESIGNATION OF THE PARTY OF

p.647.

when it was evident that the full amount of 100,000 herse-power available from The Ontario Power Company would be entirely absorbed by the Mingara System, it became necessary to provide for additional power. The Commission, having decided to ask for authority to develop its own power on Clard Pscale, laid a proposal to that end before the Provincial Severnment in 1913. Powers enabling the Commission to proceed with the project as outlined were obtained in 1914, but it was not until 1917, under "The Ontario Mingara Development Act, 1917 (7 George V. Chap.21)" that authority was given and work was commenced WJF. p.7. on what is known as the Queenston-Chippawa Power Fovelopment.

In the meantime, the demand for power had grown so rapidly that in 1915 it was necessary to purchase a temporary supply of 16,000 horse-power from the Toronto Power Company; in 1916, 50,000 horse-power additional was obtained from the Canadian Riagara Power Company, and this 50,000 was all sold by January, 1917.

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on August 1st. 1917, the Commission purchased the capital stock of The Ontario Power Company of Niagara Falls, and immediately made plans to increase its capacity by the construction of a third pipe line and the installation of two new units of 12,000 kilowatts each. The extension was completed in 1919, and the capacity of The Contario Power Company was increased by about 40,000 horse-power.

WJZ.

The contract with the Canadian Riagara Power Company was increased to 59,000 horse-power in 1919, and, in 1920, the Commission in conjunction with the City of Toronto began negotiations for the purchase of the Coronto Power Company. By the end of 1921, the Commission found it necessary to purchase additional power at Riagara Falls under day-to-day contracts to the extent of 90,000 horse-power.

WJF.

Operation of the new queens on-Chippawa plant
commenced in December 1921, with No. 1 generator of 45,000
kr-a. capacity. Four other generators of like capacity are
now in operation. No. 2 having started in March, 1922; No.
3 in October, 1922; No. 4 in November, 1922; and No. 5 in
April, 1923, completing the initial development of about
300,000 horse-power. Generator No. 6 is under construction,
and is expected to start running in the spring of 1924.
Units Nos. 7 and 8 have been ordered in anticipation of
being in service late in 1924.

Company was increased to 52,020 herew power in 1818, 226 p

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on spril 20th, 1922, an accident occurred in the plant of The Ontario Power Company which completely destroyed the two new units Nos. 15 and 16, and reduced the capacity of the plant to about 175,000 horse-power until one or both units will have been replaced. A number of other machines were damaged by water and the temporary reduction in capacity was much greater than 25,000 horse-power.

WJF. p.889.

In the broadest sonse the Hiagara System at the present time may be said to embrace:

- ment with a peak capacity now installed of about 500,000 horse-power, and which during the years 1923-1924 will likely be increased to about 450,000 horse-power.
- transmission lines, property and so forth, which are controlled by the Commission through its ownership of the entire capital stock of The Ontario Power Company of Miagara Falls and its subsidiary The Ontario Transmission Company, Limited. The capacity of this plant is about 175,000 horse-power, and is being increased to about 190,000 horse-power by the reconstitution of one of the generating units destroyed in the accident of Tpril 20th, 1922.

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(b) The generating place, branchism of the character of the case o

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 - transmission lines, property, etc., which are controlled by the Commission through the purchase of the Toronto

 Power Company. The capacity of this plant is about

 125,000 her se-power.
 - (d) The right-of-way, transformer stations, transmission lines, distributing stations, and so forth, constructed for the purpose of transmitting and distributing
 power to the various municipalities and companies on the
 system, and
 - primary or main lines constructed by the Commission to supply electrical power to customers adjacent to certain municipalities.

The Hisgara System proper, however, consists only of items (d) and (e) and, therefore, does not include any generating stations, except the very small Erindale plant on the Gredit River. At October Elst, 1921, it included 466.9 miles of 110,000-volt steel tower lines, and 1007.38 miles of lines of 46,000 volts or lower voltages constructed on steel and on wooden supports; the main transfermer station at Hisgara and fifteen step-down transformer stations supplying sixty-five distributing stations with a total capacity of about 600,000 kk-a., including reserves. The system in

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1921 was supplying 158,149 horse-power to one hundred and twenty-two municipalities, and 45,371 horse-power to twenty-four private companies and others.

and to the Essex and Thereld Systems, and in 1922 these figures were 190,625 horse-power and 51,912 horse-power, respectively.

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WJF.

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The Pleasure Numbers 20 line

General

Lake Eric and extends from Lake Ontario to Lake Euron.

The maximum extent east and west is about 225 miles from

Toronto and Hiagara Falls on the east to Sarnia, Chatham

and Vindsor on the west. At the extreme western tip of

the Hiagara System is the Essex System, which is supplied

with power from the Essex transformer station of the

Riagara System. On the Porth the Miagara System is

bounded by the territory included in the "Combined

Northern Systems", namely the Eugenia, Severn and "asdell's

Systems.

WJF. p.12.

of a step-up transformer station receiving power from a number of generating stations at Magara Falls, including the Queenston-Chippawa Power Development, a network of 110,000-volt and lower voltage transmission lines, which were furnishing power, at October 51st, 1921, to fifteen step-down transformer stations supplying one hundred and twenty-two municipalities, to the London Railway Commission, to twenty-four companies and other private consumers, and to the Essex System, and the Thorold System.

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the Seen System, and the Thorold System.

Generating Stations and Other Seuroes of Power Supply

includes three large and one small hydro-electric generating stations; The Ontario Power Company of Misgara Falls, with a present capacity of about 175,000 horse-power, which is now being reconstituted to about 190,000 horse-power; the Toronto Power Company, also known as the Electrical Development Company, with a capacity of about 125,000 horse-power; the Queenston-Chippawa Power Development With a present installed peak capacity of about 300,000 horse-power; and the Erindale plant on the Credit River. It also has available some purchased power from the Canadian Miagara Power Company at Miagara Falls.

property with a first last terminal and the same last and

WJF.

(a) The Ontario Power Company of Siagara Falls.

A description of the plant of the company may be found in pages 7 to 13 of the "General Report" on "The Ontario Power Company of Niagara Falls".

(b) The Toronto Power Company

forred to as part of the Forente Power Company was built by the Electrical Development Company, the first four 14,000

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 horse-power units being installed in 1906 and 1907 and seven 15.500 horse-power units being added between 1910 and 1914. The plant was operated under lease to the Toronto Power Company, Limited, from April, 1908, until its acquisition by the Commission under the terms of the agreement signed August 15th, 1922.

This hydro-electric plant includes a concrete wing dam at the head of the falls, 785 feet long and 27 feet high. The water is led through 10-feet steel penstocks to a wheel-pit 416 feet long. A2 feet wide and 150 feet deep. The tail water is discharged through twin tunnels, 28 foot in diameter converging below the power house inte a single tunnel 1,935 feet long with an outlet at the foot of the Horseshoe Falls. The power house, built of Indiana limestone. is of ornate and imposing design, and is 500 feet long and 70 feet wide. The plant installed is as follows: Turbines - four L.P. Morris. 69-inch vertical double-runner, 250 r.p.m., 14,000 h.p. each; seven 1.P. Morris, 75 3/4-inch, vertical, doublerunner, 250 r.p.m., 15,500 h.p. each; total 164,500 h.p.; Cenerators - four Canadian Coneral Electric. 3-phase. 25oyele, 12,000-velt, 260 r.p.m., 8,000 kv-a. each; seven Canadian General Electric, 3-phase, 25-cycle, 12,000-volt, 250 r.p.m., 10,000 kv-a. each; total 102,000 kv-a.; Exciter Turbines - two L.P. Morrie, 27 8/4-inch, vertical, 500 r.p.m., 500 h.p. each, sotal 1,000 h.p.; Exciter Dan Voti and doti al ballatani griad a dien wewey-as wol

nearly and a saling and duely nearly-event above THE GAM STREET PROS. LOT LARTEST MAY BE USED BATT TO MAD DRIVE -may family live-Of Secretar Self of wedge add . State four deather will twent to anneal year all dig-lance a ne encada that designal temporately at you're lift out again fact SWITTER AN ACTION SANT THESE STORY LEADERS ASSESS AS NOTES ASSESSED. as the next of the Dynasties relies for more bounceuniteral has sinate to of appropriate analysis to dil. deales, and in how your first only it has plant plone of the plant the parties as an Indianal Territors - from Lat. 1974 | 1977 | 1977 | agan Outgoll gamager, OSA aromest-planck; int - ALLEY CARLES AND CONTRACT OF THE STATE OF saged 606. bel fatos this and bod. of and how will be been series garde come benic conege out after-social cates tra-ta debrett force place as-we borght under a the caree contact was never a more and a statement was the SEE PARKET LAND BARRY AND LAND BARRY OFF PARKET SEED

Volt. 800 r.p.m., 300 kw. each (two being driven by the exciter turbines and two being motor-driven); and eleven direct-connected exciters, one on each of the main units; Station Transformers - three banks of three Canadian Ceneral Electric, single-phase, 2670 kv-a. each, 12,000 to 60,000 volts; three banks of two Canadian General Electric single-phase, 6,000 kv-a. each, 12,000 to 60,000 volts; total 50,000 kv-a.

Development Company plant operates under an average head of about 130 feet, and half it operates continuously at a load factor of almost 100 per cent. The auxiliary steam power station located in Toronto was originally installed by the Toronto Electric Light Josephny in 1883, but the present units were installed as follows: two 2,700 h.p. units in 1912, one 10,000 h.p. unit in 1913, and one 8,700 h.p. unit in 1916.

It is variously estimated that an amount between 12,500 and 13,300 cubic feet of water per second is required to produce approximately 141,000 horse-power, the larger figure giving about 11 her-ta-power per cubic foot per second. The best officiency of the plant is stated by the engineers to be obtained at an output between 100,000 and 120,000 horse-power. According to the agreement with the queen Victoria Riagara Palls Park Commissioners, the amount of water permitted

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The street of th

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to be diverted by the Electrical Development Company is that required to produce 125,000 horse-power.

p. 16

(a) The Queenston-Chippawa Power Dovelopment

power house of which is situated near Queenston, constructed by the Commission, is the first on the Siagara River to utilize the full head available between the level of Lake Eric and that of Lake Ontario. The water is diverted from the mouth of the Welland River at an elevation of approximately 562.5 feet above sea level, while the tail waters are discharged at an elevation of S17 feet. The average effective net head at full aspacity is estimated to be 305 feet. The generating units are designed to give maximum output at as low as 294 feet head.

The power plant is located about one mile upstream from Queenston. The water is brought from the Lake
Brie level to the power house by means of the Welland River
for about four miles, and by a canal between the river and the
forebay located adjacent to the power house but on the upper
level.

The intake for the development is at the mouth of the Welland River and the engineers of the Commission have provided for admission of water by submerged tubes should ice troubles materialize during the early years of operation. Mean-

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HYDRO-ELECTRIC INQUIRY COMMISSION

while the intake will be operated in the usual way as a submerged boom structure. Lane committee mession was men or

The canal between the Miagara River and the entrance to the forebay is 66,287 feet in length. The capacity of the intake and canal was designed to insure a working flow of at least 15,000 cubic feet per second, but the engineers of the Commission and their advisory engineers believe the flow will exceed this amount, some calculating it at over 18,000 cubic foot per second. A discussion of this point in detail will follow in a report by Mr. Walter J. Francis.

The screen house is placed 75 feet back from the edge of the garge and provision is made in the design for either aims or ten main inlets for the penstocks to the main turbines and for two inlets for penstocks for service turbines. Rach main inlet is divided into three sections by piers and in each section there is a screen, upstream from which slots for merchal from a C on sort of the stop-logs are provided.

The upper two-thirds of each main penstock is 16 foot in diameter and the lower third is 14 feet. The distance from the inlet screens to the centre line of the turbines is about 460 feet. The penstooks are covered with eighteen inches of concrete and at the lower end of each a Johnson valve is installed. The harms formation at he want because our

The generating station is at present completed for five vertical-shaft units nominally of 55,000 horse-power each. It is later proposed to install either four or five

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installed plant capacity about 550,000. The present turbinos are designed to operate at 187.5 revolutions per minute under a head of 505 feet, and they have a guaranteed efficiency of 88 per cent.

Each turbing is directly connected to a 45,000 party was strained true also emphises distant and introval. kv-a., 12,000-volt. 3-phase. 25-cycle generator. Current OF STREET, LINESPERSON BLOCKS IN LANGUAGE, LANCE ASSESSED. limiting reactors are provided between generators on the 12,000-volt bus. The generators show very high efficiencies. CONT. IN COLUMN 2 AND CO. STATES AND WHAT A REAL PROPERTY OF THE PARTY and the overall efficiency of the generators, turbines, and the free winning from white me switchgear from the water to the 12,000-volt bus bars is apparently over 90 per cent. Transformers step up the the first newne-point topicture our voltage to 110,000 volts to supply power to the Hisgara Africa 1-consepted to the first AVE-21 thing to 4-blance At-leasing System. Karling Marian Control of the Contro

and the lower river, the output per cubic foot of water per second at 90 per cent. efficiency is approximately 31 horse-power delivered at the low voltage bus bars.

The liabilities of the Commission with respect to the Queenston-Shippawa Development amounted to about \$58,000,000 at October 31st, 1921, and about \$62,000,000 at March 31st, 1922. The total capital cost with about 550,000 horse-power nominal installed capacity when completed will probably be of the order of \$75,000,000 or \$80,000,000.

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(d) The Brindale Plant

the Credit River, was installed in 1910 with a capacity of about 1,600 horse-power. The plant formerly operated under an average head of 56 feet, but this head has been reduced owing to unrepaired damages to the dam structure. Auxiliary power was obtained from the combined steam and hydraulic plant of the Interurban Electric Company, near Lambton.

Ontario.

concrete core, 700 feet long and 35 feet high, from which a 900-foot tunnel lette to Parrage tank immediately adjoining the concrete power house. Two 850 horse-power turbines are direct-connected to two 600-kilowatt, 3-phase, 60-cycle, 13,200-volt generators. The plant is operated from one to five hours daily during peak loads, and is connected to the Siagara System through a frequency-changer set, the generator of which may be used as a synchronous condenser when required. The Brindale generating station was purchased by the Conmission in 1917, and on December 14th of that year its output was first delivered to the Biagara System.

(o) The Canadian Niagara Power Company

The plant of the Canadian Riagara Power Company,
from which a large block of power has been and is being purchased for the Riagara System, is situated above the Horseshoe

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Falls, the headworks being adjacent to the power house. Exter is drawn from the Mingara Miver at a point 500 feet above the creat of the Horseshoe Falls through an excavated intake canal, 496 fest wide and 200 feet long, protected at the entrance by a system of ice shields, and leading to the stone power house which is 72 feet wide by 580 feet long. The turbines are installed in a deep pit and operate under an average head of 128 feet. The water is admitted from the forebay through short penstocks and is discharged from the wheels through a long, underground, brick-lined tunnel of oblate section, 18 feet by 26 feet in section, with its outlet at the foot of the Falls, just below the generating station of The Ontario Power Company of Miagara Falls. Long vertical shafts connect the turbines with the generators, which are installed in the power house at the ground level 122 feet above the turbines. There are ten main units, five of 10.250 horse-power, three of 10.750 horse-power and two of 12,500 horse-power, a nominal total of 109,000 horse-power. It is understood that an eleventh unit is now being installed as a spare. All generators are three-phase, 25-cycle, 12,000volt units, and have a combined capacity of 69,500 kilowatts. Mearly all of the energy of the plant is sold in bulk at 12,000 volts or at 22,000 volts, the output being divided as follows: Hydro-Electric Power Commission of Ontario. 50,000 horse-power from 1916 to 1922 inclusive, and 20,000 horse-power thereafter;

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and the state of the same of t that had been a so with company the work works all widow AND DESCRIPTION OF PERSONS ASSESSED AND THE PARTY WAS DEPOSIT TO ta Asimorous andli sino bea b eds of gashand han empirish a against being your or all the rear and it all thems among ween and the weber oranged too the coop o at hellowerl our reals ... ed Est to thinks at metho and . seet the to ATT AND ADDRESS OF THE PERSON to have a portlevitte among some panel a discort alreig THE REST OFFICE AND PARTY OF THE PARTY OF TH wer demand of Milgare Selie, Length to to the the same and the same of the sam RATES SHOULD SEE THE SHOULD NAME AND ADDRESS OF THE OWN OFFICE AND ADDRESS. ovil garian alam and ove exect wandidwed IN CASE STREET, SHIPS TO SHIPS I WANTED TO SHIP THE PARTY OF THE PARTY o to the grade of the first to the first of finished . ARCHITECT SOURCE STORY OF THE STORY OF STREET STATE STREET, STATE STATE STREET, STATE STATE STREET, STATE ST 安性分离证据 建铁 经基础帐 经基 经基础的 经基 医结肠囊炎 comos is a compart of the compart of TENNIC - BUTCH COC. 170 . DENISHED .

Miagara Falls Power Commany, 30,000 horse-power to

40,000 horse-power; the Buffalo General Electric Company
is supplied through the Miagara Falls Power Company, while
the other consumers include the Morton Company, the
Canadian Aloxite Company and the Graphite Company, these
consumers using the energy for electro-chemical purposes.
The plant was constructed in 1904 and additional units were
installed in 1913 and 1916.

Between 8,225 and 9,600 cubic feet of water per second is required to develop 100,000 horse-power in the station, the larger figure giving approximately 10.5 horse-power per cubic for per second.

WJF. p.21 & 22.

(f) The International Bailway Company

The plant of the International Railway Company also derives its energy from Niagara Falls. It includes an 8-foot penstock leading to a stone power house where a head of only 65 feet is available. Two turbines of 1,000 horse-power each are belted to five 200-kilowatt, 600-velt direct-current generators, and one turbine of 2,000 horse-power is direct-connected to a 1,500-kilowatt, 600-velt, direct-current generator, making a total capacity of 2,500 kilowatts. The power is used by the company for electric railway purposes, with an annual load factor of about 29 per cent. This plant was installed in 1895 and was extended about 1899. The peak load in 1921 was said to be 1,200 kilowatts, requiring probably 500 to 400 cubic feet

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of water per second.

WJF. p.22.

MOTA: The plant of the International Railway Company is not controlled by the Commission, and has no connection with the Riagara System, but a description of it is given for the purpose of making a complete record of the generating stations in the vicinity of the Falls.

Parallel Operation of the New gard System

generate power at 25 eveloc, while the other systems of the Commission are supplied at 80 cycles. Then the leads on the adjacent systems increase beyond the capacity of the local generating stations power must be supplied to them from outside sources, and it seems likely that the available excess capacity of the Biagara System will be used to supply the needs of the Bugenia, Revern and Wasdell's Systems; but frequency-changers will be required to transform from 25-cycle to 60-cycle power. The Baser System is now supplied at 25-cycles from the Essex transformer station of the Biagara System.

There has been some discussion also regarding the supply of Miagara power to Central and Eastern Ontario, for example to the Central Ontario (Trent) Section of the Central Ontario System near Oshawa.

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Undeveloped Power Sites

materially increased unless a greater diversion of water from the Biagara River and the selland River is permitted, or unless the plants were re-located on sites comparable in a hydraulic sense with that of the Queenston-Chippawa plant. The latter course is impracticable at present, and the former would necessitate a revision of international treaty agreements.

The Ontario Power Company is stated to be able to develop about 15 horse-power per cubic foot of water per second; The Toronto Power Company about 10 horse-power per cubic foot per second; and the Canadian Miagara Power Company about 10.5 horse-power per cubic foot per second. If no additional diversion of water is allowed by international agreement, it would seem to be advisable to use the available water so far as economically feasible under the maximum head.

side is capable of developing considerably over 1,000,000 horse-power, if used at the full head with an output of about 30 horse-power per cubic foot per second, as is said to be obtained in the Queenston plant. Under existing conditions without diverting any of the water from The Outario Power Company or the Toronto Power Company, only about one-half of the above amount can be generated.

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Miscellaneous Power Plants in the District

There are a large number of power plants within the boundaries of the Niagara System. Some have been idle since the system took over the supply of power, and others are in service in municipalities which have not yet joined the Niagara System. A number of the idle plants are available for local use in emergency. A table of the various plants giving the location, capacity and ownership of each is shown on pages 24 and 25 of our Consulting Angineer's report.

Transmission Lines

up to ectober 31st, 1921, the Commission had acquired or constructed 466.9 miles of 110,000-volt steel tower transmission lines, forming a high voltage primary network receiving power from the step-up transformer station at Niagara Falls and feeding fifteen step-down transformer stations which are listed on pages 26 to 29 of our Consulting Engineer's report. Four of these stations step the voltage down to 26,400 volts. The remainder transform to 13,200 solts, to supply the various municipal and other corporations and consumers, comprising the Niagara System, through 91 distributing stations. The accondary distribution lines comprise in all 1,007.4 miles and are constructed on steel and wood supports.

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Fransforming & Distributing Stations

System is the Siagara Transformer Station at Siagara Falls
South, to which power is delivered at 12,000 volts from
The Ontario Power Company, the Toronto Power Company, and
the Canadian Siagara Power Company. Part of this power is
transformed to 48,000 volts to supply four distributing
stations, but the larger part is raised to 110,000 volts
to supply the high voltage system with its fifteen stepdown transformer stations deeding the 67 distributing
stations formerly referred to. A table of transformer
and distributing trainer of the system, giving the voltage
and capacity of each is shown on pages 26, 27, 28 and 29 of
our Consulting Engineer's report.

The following table shows the total capacity of the Hiagara System:

Station		Capacity E. V.1.		
Potal Capacity	of Mingara System			
	excluding Reserve	426,150		
lagara System	Reserve Capacity	171,575		
	Misgara System			
*	including Reserve	597.725		

WJF. p.26.

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Local Distributing Systems

mentioned, there are no municipalities on the Niagara

System in which the Commission distributes power ratail

to consumers. The Commission acts as wholesale distributor,
and in all the municipalities the electricity is distributed
by the municipality itself or by the local commissions in

the municipalities. The accounting for all of the municipalities of the Miagara System is under the direct control
of the Commission, and we understand that it is being cone
in accordance with the commission.

A map showing location of generating stations, transformer stations and transmission lines forms the frontispiece of this report.

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GENERAL PRONOUTES

In this report "General Economics" is divided into

two sections, - Section # 1 dealing with the Sizgara system

proper, being transmission lines, transforming and distrib
uting stations and rural lines only, and Section # 2

dealing with the future operation of the System in its

broadest sense, including the Queenston-Chippawa Develop
ment, the Ontario Power Company, etc.

minists relative to the immunity to me there.

SECTION 4 1

Santtal Investment PY

Under authority of the cower Commission Act and agreements with the Municipal Corporations of Toronto.

London, Suelph. Stratford, et. Thomas. Woodstock, Mitchener.

Galt. Hespeler. St. Marys. Freston, Materice, New Hamburg.

and Ingersoll, the Commission constructed transformer stations.

transmission lines and distributing stations for the purpose

of furnishing electrical energy to the said municipalities.

LANGERT LANGE LANGE RATES, NAME AS TOROUTE

The Hingers Rural Lines which consist of primary or main lines were constructed by the Commission in order to P.W. provide electrical energy to rural customers adjacent to p.485 certain municipalities in the Hingers System and the delivery of power over these lines commenced in the fiscal year ending October Sist. 1915.

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System proper and Hisgara rural lines, by years from 1912 to 1921 inclusive, are as follows:

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Table of Progressive Capital Coats

COUNTRY OF LAND, MARKETTE

Sapital Assets	As at Year ending October 51st 1912 1913 1914 1915 1916
Pransmission	Market Commence of the Commenc
Lines Fransformer A	\$2,798,210\$5,509,526\$5,505,047\$6,870,462\$6,748,650
Distributing	
Stations	1,360,611 1,645,450 2,339,246 2,739,520 3,063,390
iural Lines _	- 35,883 159,382 275,118 524,168
Totals -	\$4.154.92.35, 190, 859\$6,005,675\$9,584,900\$10,136,208
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	Wahle of Programmetra Conte (annit) - SS
	Table of Prograssive Capital Costs (con't) p.35
	Pable of Prograssive Capital Costs (con't) p.35
epital Assets	Pable of Prograssive Capital Costs (con't) p.35
Spital Assets	Pable of Prograssive Capital Costs (con't) p.35 As at year ending October 51st 1917 1918 1919 1920 1921
Pransmission	Pable of Progragalve Gamital Coats (con't) p.35 As at year ending October 31st 1917 1918 1919 1920 1921 87.702.415\$ 8.009.097\$ 8.042.416\$ 8.197.520\$ 8.790.6
ransmission Lines	As at year ending October 51st 1917 1918 1919 1920 1921
Pransmission	### As at year ending October 51st 1917 1918 1919 1920 1921 87.702,415\$ 8.009.097\$ 8.042,416\$ 8.197,526\$ 8.790.6

Clarkson, Gordon & Dilworth that during the fiscal year ending Outober 31st, 1922, the Commission made additional expenditures

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\$12,159,532\$13,783,458\$14,306,572\$14,969,019\$17,600,662

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on the Miagara System in the amount of \$5.895.822.78. making a total investment in the Miagara System proper to will no pobel from the at October 31st, 1922, of approximately \$21,695,000.00. The expenditures made during the fiscal year ending 1922 on of the system when him I too comprise the fellowing: months and for daily that he was been been an expense.

Right-of-way \$ 159,770.11 Steel tower lines Transformer Stations 2,245,446.80 Wood pole lines Rural Lines 447.931.88

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2 o t a 1 - 35.895,322.78

The fillowing table indicates the capital cost ATTENDED TO THE PARTY OF THE PA DIAMEN BLICK D per horse-power purchased for each of the years ending the country persons will a study but I October 31st. from 1912 to 1921 inclusive:

	Fis	sal Year	ending	October	Slst
and the lamest a	1912	1913	1914	1915	1916
Fransmission Lines Fransforming and	\$185.70	\$96.60	\$106.50	\$79.8 0	\$64.10
Distributing Stations Sural Lines	66.00	45.50			
, Totals -	\$201.70	\$142.90	\$154.90	\$117.50	\$ 96.30

#JF .- p. 48

		71sc	a	Year 1918	01	1919	00	tober 1920	31	1921
Transmission Lines Transforming and	\$	56.30	*	58.20	*	54.30	4	47.40	*	45.90
Distributing Stations		30.30		38.50		39.10		36.40		44.50
Rural Lines	naguri ogge	3.40		3,50		3,20		2.60		2.50
Zotale -	4.5	98.90	91	20.20	5	96.60		386.60) ;	92.90

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apital cost per horse-power for transmission lines was high in the early years of the system when the load was scattered but declined as the load density increased. The capital cost per horse-power for transformer and distributing stations shows a decrease during the years 1915 to 1918 and in 1920 when the stations were loaded heavily, but in 1921 returned to approximately the pre-war figure.

October 31st, 1921, that additional funds will be required wing the fiscal year ending October 31st, 1923, in the panent of \$3.545,000.00 for extensions and betterments to the Hiagara System lines, stations and rural lines.

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WSP. p.37

Reserve for Renewals

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The balance from the reserve for renewals at October 51st, 1921, amounted to \$2,222,365.90 made up as follows:

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	Reserve	A per cent.	
Period 1912 to October			7
51et, 1916	\$684.368.90	342.993.63	3727,362.53
fear ending October Slat			W
1917	221,543.00	29.094.60	250.657.60
1918	266,579.32	89.245.52	305.824.84
1919	293,940.60	51,428.28	345,560.68
1920	310,519.12	65,205.39	375,724.51
1921	322,462,26	80.234.41	402.696.67
Together -	2,099,413.20	\$506,201.85	\$2,407,615.08
Less Miscellaneous I	eductions (not	1	165,249,13
Total at October 31s	t. 1921		\$2,222,365.90

COPY

The additions to the reserve for renewals on the Biagara System have been provided by insluding on a sinking fund basis in the cost of power each year an amount equivalent to 2% on the capital investment of the system exclusive of right-of-way. Interest at 4% is added on the credit balance in the account at the close of the preceding year. Charges against WJF. p.54 the reserve consist of expenditures on account of renewals, replacements, etc.

The method of providing additions to the reserve, known as a sinking fund basis, is equivalent to a renewal rate of approximately 4% per annum on the so-called "straight-line-basis", that is to say, while the amount of the annual provision under the sinking fund method increases each year through interest accumulations and those under the straight line

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WJF. p. 54

method remain constant, the amounts accumulated by either mothed would be approximately the same at the end of a given period - in this case twenty-five years.

The annual rate of 21% for renewals was determined in 1917 on the basts of a re-classification of the proporties of the system as at October 31st, 1916, made by the Engineering Department of the Commission. This rate has continued in force to October 31st, 1921, and the reserve as constituted at that date has been computed upon the same Balletta. basis from the beginning of operations in November, 1911.

In commonting upon the adequacy of the renewal accounts as at October 31st, 1921, our Consulting Engineer has stated as follows:

"It is understood that it is the practice of the Hydro-Electric Power Commission to spend suffisient money on maintenance account each year to keep each and every portion of the System in a condition to operate in accordance with the requirements of economical production, which, it is stated, is about 75 per cent. as good as its original new condition. If this be so, the consideration of the renewals account might well be studied in connection with and applied to the renewal of only 25 per cent. of the depreciable capital concerned.

The total invested capital is the Sisgara distribution system proper at October 31st, 1922, is on the order of twenty-one or twenty-two millions of dollars of which the depreciable amount is probably between eighteen millions and twenty millions. Considering all the factors, the portion of depreciable capital to be covered by a renewal account might be considered as between five million dollars and six million

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dollars after making allowance for the portion said to be provided for in the maintenance account as above mentioned. As the Miagara System was commenced twelve or thirteen years age with a comparatively small capital, and as the invested capital has been steadily increasing year by year, it would appear that the total amount in the reserve account, which now stands at a figure between two and three million dollars, is sufficiently large to serve the required purpose."

WJR. p.55 6 57.

PARL.

We have been informed by Mr. Guilfoyle of
Messrs. Clarkson, Gordon & Dilworth that the engineers of
the Commission have made a re-classification of the
proporties constituting the Miagara System proper and have
reduced the renewal rate from 2% to 1% per annum with
interest added at 4% per annum as was the previous practice,
to be effective from October 31st, 1921. It will be noted
that this represents a reduction in the annual provision
for renewals of approximately 50%.

Reserve for Sinking Fund

Commission Act, the Commission is required to provide
"an annual sum sufficient to form in thirty years, with
interest at four per cent. per annum, a sinking fund for
the pepayment of the advances made by Ontario under this
Act for the payment of the cost of the works", and under
Paragraph (2) of the same Section "a municipal corporation

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which has entered into or shall hereafter enter into a contract with the Commission for a supply of power may be relieved by the Commission from payment of any sum on account P.W. p.16 of the sinking fund account for the first five years, during & 17. which payments are made to the Commission by the corporation under such contract, and the amounts required from such corporation peration on sinking fund account shall be payable during the them next ensuing thirty years.

The basis for ascertaining the amount of the reserve for sinking fund each year is, for the Niagara System

Lines and Stations, the capital cost of the transformer stations and transmission Plikes, etc., completed and in operation. The method used by the Commission in calculating the amount of the reserve is as follows:

- The annual sum sufficient to form in thirty years, with interest at four per cent. per annum, the amount of capital invested. This sum is equivalent to an annual rate of 1.8% of the principal invested.
- The capital investment of the respective sections of the Lines and Stations is distributed to the municipalities and others receiving power therefrom in the proportion that the horse-power furnished each customers to the aggregate horse-power furnished all quetomers on these sections of the lines.
- The rate of 1.8% is applied to the principal so determined, proper allowance being made for any units of plant in operation less than a year.
 - The portion of the reserve, determined as outlined in the foregoing, applicable to municipalities in operation for a period of six years or longer, is included each fiscal year in the cost of power furnished the respective municipalities. For such

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municipalities as may not have been in operation for that period the sum apportioned against the municipality in its first year and deferred, is included in the cost of power in sixth year of operations, etc.

as permitted under the act, the collection of the sinking fund was deferred for a period of five years in the cases of all municipalities in this system. The balance in the sinking fund reserve at October 31st, 1921, in the amount of \$957,717.89 is made up as follows:

Balance at credit of Sinking Fund
as at October Sist, 1916
Amounts included as part of the
sout of power in five fiscal
years ending October 31/1921:
20 Ennicipalities \$629.781.67

To Companies 178.440.66

Interest at 45 per annum
Ni scellaneous -

Oredits Charges

Balance as at October 31st, 1921

\$74,706.45

\$629.761.67 178.440.66 808.222.33 73,158.61

2,222.26

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P.W.

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\$957,717.89

Of the total amount of \$937,717.89, as shown above, \$670,525.56 and \$287.192.33 were credited as being applicable to municipalities and to companies respectively.

Deponent up the year above to the product but have been

The above shows the aggregate amount of the sinking fund collectible at October 51st, 1921, from 79 municipalities which have taken power for six years or longer, the initial charge in each case being made in the sixth year's power cost.

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of \$507,717.69 is made up as fillers;

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Reserve for Contingencies

October Slat, 1921, amounted to \$34,875.01. The reserve was established by the Commission for the purpose of providing for special lesses or expenses not arising at regular intervals and not wholly applicable to the period in which incurred.

The provision for contingencies in respect of the P.W. p.20

- (a) An annual charge of \$37,500.00 included as a part of the cost of power delivered to municipalities and consumery customers.
- (b) The net profits resulting from the sale of power to sundry customers,
 - (c) Profit from sales of miscellaneous material,
 - (d) Interest at 4% per annum on the monthly balances.

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The following is a summary of the reserve for contingencies to October Sist, 1921:

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P.W. p.20

Amounts included as a part of	
the cost of power delivered	
20 Municipalities \$151,695.07	
20 Sundry Customers 55,674.25	\$167,359.32
Net profit from sale of	
power to sundry oustomers	78,932.96
Net profit on soles of alu-	
minum cable, sundry equip-	
ment, etc.	7,645.80
Miscellaneous material re-	* **
covered, proviously charged	
to construction, operations,	
010.	22,097.90
Interest at 4% per annum	9,314,90
HI COMPANIE TO SERVE THE TAXABLE TO	
Total Gredits	\$305.350.68
THE STREET, BY DESCRIPTION OF SHARE	
Deduct - Expenditures to	
cover contingencies met	
with for year ending	
October 31st, 1918 \$135,140.70	
1979 P 70,840.96 1980 P 70,840.96 1921 80,917.67	
The second secon	學術法 泰 差 人名 第二种美
1921	280.475.87

Details relative to the expenditures made and charged against the contingency reserve are shown on Exhibit 6A of Messrs. Price, "aterhouse & Company's report on the Niagara System dated October 9th, 1922.

ADMINISTRATION OF THE RESERVED OF THE PARTY OF THE PARTY

Balance as at October 31st, 1921

It will be noted that the balance is much less than the average contingent expenditure for the last four years and our Consulting Engineer expressed the opinion that consideration should be given to the provision for a larger reserve for contingencies.

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Accounts with Municipalities

Accounts with municipalities are divided by

- (a) Power Accounts Receivable
- (b) Due by or to municipalities in respect of power furnished them, as determined under the Power Commission Act.

(a) Power Assounts Receivable

October 51st, 1921, amounted to \$476,448.68. These accounts represent unpaid balances in respect of interim power bills P.W. rendered which are paid currently by the sunicipalities and were all paid at September 20th, 1922, (the date that they were examined by our Auditors), with the exception of accounts aggregating \$4.399.87.

DATE LAND

(b) Due by or to Municipalities in Respect of the Cost of Power

At the close of each fiscal year, the interim power bills rendered monthly are adjusted to meet the operating costs of the system as provided by the Power Commission ict.

At October 31st, 1921, as a result of these adjustments, 65 municipalities had credit balances aggregating p.23 \$207,815.60 representing overpayments, interest allowances, etc., 59 municipalities had debit balances aggregating \$190.814.41 representing underpayments, interest charges. etc., and one municipality had no balance.

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Of the \$190,814.41 owing to the Commission, \$146.042.11 had been paid prior to September 20th, 1922, (the date that these accounts were examined by our Auditors), leaving \$44.772.30 still owing at that date, consisting of the following:

Bolton	\$2,611.64
Brigden	1,257.65
Burford	2,198,42
Comber	2,055.02
Dolaware	72.02
Dereham Inp.	1,412.05
Dublin	535.64
Dunnville	7.736.26
Embro	1,997.53
Pergus	1,107.78
Ooderich	8,511.99
Harristo DV	572.44
Kitohonar all	5,338.77
Niagara Palls	775.45
Oil Springs	303.23
Plattsville	873.01
Princeton	907.22
Rockford	1,150.20
Springfield	54.29
Thorndale	1,356.50
Welland	2,381.46
Wyoming	1.572.97
	150 500
Total -	\$44,772.50

P.W.

DERLIES.

NAME AND POST OFFICE ADDRESS OF

Section 23a of the Power Commission Act provides

STREET, STREET, SECTION.

that;

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"The Commission may from time to time during the first three years after any municipality shall first begin to take power from the Commission extend the time for payment of sums payable by any municipality."

lated during pariods extending beyond the three-year limit

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as permitted by the above section of the Power Commission THE RESIDENCE OF LAND Act, and for that reason certain of the municipalities are in default in the payment of their power bills.

Results of Operation

THE DUT HATERANDE

Power is supplied to the municipalities on the Fiagara System on a cost basis as outlined in the Power Commission Act. The cost of such power includes:

- 1. Operating and maintenance expenses.
- 2. Interest on moneys invested in the works of the dystem.
- 以 提 · 集 · 建 Provision for the ranewal of the works.
 - Sinking fund on a thirty-year basis to rapay the investment in the works of the System.

years ending October Slat, 1921, is as follows (cents emitted): P.W.

The operating account of the system for the four

WHEN PARK STATE OF THE PARK ST Ex.I. Year Ending October 31st. 1918 1919 1920 Revenue From Municipalities \$2,247,495 \$2,535,979 \$3,180,161 \$3,542,029 From Companies 483,547 534,131 570,905 750.466 \$2,731,042 \$3,070,110 \$3,751,066 \$4,292,495 Total Revenue Operating Expenses & Fixed Charges Power Purchased ... 41,385,706 \$1,517,458 \$1,966,305 \$2,411,965 Operating & Maintenance Expenses 295,224 346,632 333,462 359.416 Overhead Expenses 101,594 159,282 251,416 296.663 Interest 481,815 503,734 644,859 668,319 Gravisions for Renowals 266,580 293,941 310.519 322.462

Fund 158.482 151,246 195.570 Provisions for Contingencies 37,500 37.500 37.500 Total Operating Expenses & Fixed \$2,696,899 \$3,089,795 \$3,739,851 \$4,308,563 Charges Profit or . transforred to Reserve

for Contingencies

Provisions for Sinking

334.143 \$19.683 \$11,215

212,238

37.500

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222,24	BEEFFERE, CO.		8 1 1 1 1 1 1 1 1 1	Andrews of the second s
, RC 6	\$64,696	246,658		8 - 8 1 - 1 8 - 1 - 1 1 2 - 1 1 2 - 1 1 2 - 1 1 2 - 1 1 2 - 1 2 - 1 2 - 1 2 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1 2 - 1
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Year "nding October 31st. 1918 1919 1920 1921 WJF. 0.39 156,828.8 185,836.8 177,419.4 201,520.9 \$19.85 \$21.05 \$21.32 WJY.L

Rorse-Power Billed Cost per H.P. Billed

The profits or lesses shown above for the four years ending October 31st, 1921, resulting in a net profit of \$9,605.00 arose in connection with supplying power to private companies; the municipalities having paid the actual cost of all power 10 furnished to them. As regards power sold to private companies 16 prior to Cotober 31st, 1917. Mr. C. T. Clarkson states as follows in his 1917 and it report:

"To 31st October 1917, a net profit of \$178,842.31 was ourned by the system from power sold to corporations other than municipal ones. Of this amount, the profit of \$117,569.21 for the period ending October Sist, 1916, was applied in reduction of the maintenance cost to be met by municipal cerporations under contract with the Commission and the profit \$61,478.10 for the fiscal year ending October 31st, 1917, was applied to the Contingency Reserve."

The names of the more important companies and others to whom power was sold under contract during the four years ending October 31st, 1921, and the amount of revenue therefrom and the average rate per herse-power are as follows:

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	19	8			ding 00			21
Соврану	žau oda		amount	make the control of t	amoun t	Property staff or conditional field in collection	amount	por E.P.
Buldwin's Ltd.	-	980	1900	**	\$28,908	18.64	\$54,652	\$16.50
Consdian Salt	\$54,958	35.24	\$70,404	35-85	\$85,784	37.49	70,824	39.68
Galt, Prest on								
& Hospelor Railway	22_185	24.26	21_922	28.21	23.828	26.27	24 267	25.00
Lake Erie &			, ""		4			m # 0 0 0
Northern Rly. Brant	Marie Co.				19,000			23.50
Simoos	10 450	20.00	11 066	10 00	11,842	20 115	19 690	10 01
St. Mary's	100							
Shale Drick	41,646	31.00	51,771	31.00	58,475	31.00	65,905	31.00
Co., Ltd.	101.	1,451	6,907	25.13	19,464	25.00	18,643	25.29
Union Carbide	CO	PA	સ્ટાર કાર્ય જૂત ને જ લ ૂકો	e	22 m 198 de 18 f			
Company	267,481	14.00						
Resex System Ringers Power	april 1884, il serio delle i politici e i	ATM [®] Newton	706 F 67	045 a 04	, 29,895	84.70	34,079	98.91
Development -					. 7.47	33 86		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Ohippewa Nontrosa		der der	400e 400e	4011			6,248	
Whirlpool Sundry	15,000	9.98	56,154	11.05	91,857			
Companies	55.677		52.954	Chapter of the Chapte	69.146	***	63,689	Hillands and great and assessment of the con-
Total -	8485,547	- 3	534,181	- 8	570,905	- 8	750,466	400

p.12;

The Riagara Power Development and the Besex System were charged for power on a cost basis.

The variation in the cost of power sold to the Union Curbide Company in 1920 and 1921 is attributable to a special arrangement made by the Commission wish the company to the effect that they would not take power during peak load periods.

THE DALES

AR WEIGHT DERING DON'T DESIGN 0174 3/14, 1444 the same and the same are a discount for the party of the (是在各位,在各个各位,在上海中的中,是在在全人 . . · 4 24 NO CHARLEST LAND IN THE SELECT VALUE VALUE VALUE INV. AN PRINT SELECT SEATINE TOURS AND AGENCY AND THE PROPERTY AND THE PERSON WILLIAM TO A PROPERTY AND THE £30000 I THE THE REAL PROPERTY AND THE TREE PROPERTY AND THE PRO : 1 2 1 1 1 1 1 E TO THE STATE OF market blass IN THE STATE AND ADDRESS AS A REAL PROPERTY. 16 . I 1 3 M 10 . T. AD ROT. BES L. We. The same or & B. 教養等者 有物 海菜店 MATRIE ERICAL NATIONS OF BUILDING ? IL ADELD REALL LINEAD anequist. E BURLET SYNEE BUT, BU MINING AND IL MIN, DOLGE, DE THEAT MALL JOI, 48 Stat , , , Local SINT 41144 137,83

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NATURE CONTRACTOR OF THE LARGE CONTRACTOR OF THE STATE AND ADDRESS OF THE STATE OF

The following table shows the sources of power purchased by the Hingers System during the four years ending October 31st, 1921 (cents omitted):

Year ending October 31st.	Ont as Power Compo Amount	11/14=1	Can ad Hiaga Power Amo unt	Fa	Sundry Itoms Amount	Potal Amount
1918 \$8	12,024		\$539,645	\$12.00	\$12,233	\$1,585,706
1919 (41,989	9.00	598,597	18.00	25,047)	1,617,458
	70,482 42,336		584,683 130,937	18.00	137,865)	2,966,304
3	73,295 40,250 07,875	9.00 12.75 16.00	L is.	12.00	193,514)	2,411,965

P.W.

"Sundry Items" in the above table will be found on pages 13 and 14 of Messrs. Price, Waterhouse & Company's report on the Miagara System dated October 9th, 1922.

THE RESIDENCE COMMISSION AND PARTY BEING THEFT IS

The average cost per horse-power purchased for each of the years from 1918 to 1921 inclusive is as follows:

	1918	1919	1980	1921
cost of power	\$1,585,706	\$1,517,458	\$1,966,304	\$2,411,965
Horse-power purchased Cost per horse-	137,642.6	148,030.6	172,912.8	191,572.9
Don of	\$10.07	310.25	311.36	312.55 W.J.P.

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A . T. · · · · · The following table showing the detailed costs per horse-power billed, illustrates in what respects and to what extents the operating costs and fixed charges have varied during the years from 1913 to 1921 inclusive:

WJF.

	71	scal Y	****	nding	Octobe	r 51a	5 ,	
1918	1914	1915	1916	1917	1918	1919	1920	1921
j. 1			V & 3	1. 4				
A. s. a l	P. A. M. C.		41,58	1				
\$8.79	9.18	9.09	9.12	9.20	8.04	9.74	11.06	11.92
1.18	1.04	. 76	. 8.5	.74	.74	1.06	1.07	.96
1.12	1,89	1.41	1.65	1.71	1.08	1.17	.81	.82
.69	-64	.61	.41	+42	.70	1.03	1.40	1.47
4.85	4.04	4.15	3.39	3.04	3.07	3.75	3.65	3,31
1					1.70	1.89	1.75	1.60
13.60	2.01	3.05	3.21	5.42	.88	.97	1.10	1.05
3		DV			. 24	.24	.21	.19
	\$8.79 1.18 1.12 .69 4.85	\$8.79 9.18 1.18 1.94 1.12 1.89 .69 .64 4.85 4.04	\$8.79 9.16 9.09 1.18 1.04 .76 1.12 1.89 1.41 .69 .64 .61 4.85 4.06 4.15	\$8.79 9.18 9.09 9.18 1.13 1.04 .76 .85 1.12 1.89 1.41 1.65 .69 .64 .61 .41 4.85 4.04 4.15 3.39	1915 1914 1915 1916 1917 \$8.79 9.16 9.09 9.15 9.20 1.13 1.94 .76 .85 .74 1.12 1.89 1.41 1.65 1.71 .69 .64 .61 .41 .48 4.85 4.96 4.15 3.39 3.04	\$8.79 9.16 9.09 9.12 9.20 8.84 1.13 1.94 .76 .85 .74 .74 1.12 1.89 1.41 1.85 1.71 1.08 .69 .64 .61 .41 .42 .70 4.85 4.86 4.15 3.39 3.64 3.07 1.70 13.60 2.81 5.05 5.21 5.42 .88	\$8.79 9.16 9.09 9.12 9.20 8.84 9.74 1.13 1.04 .76 .85 .74 .74 1.06 1.12 1.89 1.41 1.85 1.71 1.08 1.17 .69 .64 .61 .41 .48 .70 1.03 4.85 4.06 4.13 3.39 3.64 3.07 3.75 } 3.60 2.81 5.05 3.21 5.42 .88 .97	88.79 9.18 9.09 9.15 9.20 8.84 9.74 11.06 1.13 1.94 .75 .85 .74 .74 1.06 1.07 1.12 1.89 1.41 1.65 1.71 1.08 1.17 .81 .69 .64 .61 .41 .42 .70 1.03 1.40 4.85 4.84 4.15 3.39 3.64 3.07 3.75 3.85 1 1.70 1.89 1.75 13.60 2.81 3.05 3.21 5.42 .88 .97 1.10

\$20.10 19.60 19.03 18.63 18.53 17.25 19.85 21.03 21.32

taken by each of the municipalities on the Niegara System. It is of interest to note that the municipalities, with a few exceptions, have taken an increased amount of power each year. The growth of the load for each municipality may be seen by a comparison of the minimum and maximum yearly loads, the minimum yearly leads being in the early year of the system, and the maximum load for the most part being in the fiscal year ending Setober 31st, 1921, as will be observed from a comparison of the yearly maximum load and the 1921 actual horse-power load.

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	Date 1		Yoarly Minimum	Yearly Haximum	Average Yearly Load	1921 Actual
Municipality		Wak on	Load	Lond	to Oct. 31,	Load
manto rim rroll		to sorter an ele	H.P.	Hala	1921 - H.P.	H.P.
acton	Jan.	1915	64.4	203.7	136.1	203.7
Ailsa Graig	Jan.	1916	17.9	127.9	89.7	127.9
aylmor	March	1918	139.6	180.1	158.2	180.1
å.y.r	Jan.	1915	35.9	75.3	49.0 1	75.3
Badon	May	1912	55.9	187.4	152.4	167.4
Beachville	Aug.	1912	84.7	251.9	185.2	281.9
Blenheim	Hov.	1918	73.9	145.8	109.5 7	145.8
Bolton	Feb.	1915	77.3	121.0	96.7 /	121.0
Bothwell	Sept.	1915	27.2	141.2	82.1/	141.2
Brampton	Nov.	1911	430.4	911.7	676.6.	900.3
Brantford	Zeb.	1914	1,209.9	4,330.0	2.677.9	4,330.0
Brigdon	Jan.	1918	71.5	81.4	77.1	78.5
Burford	June	1918	30.9	43.1	35.8	45.1
Burgessville	Hov.	1916	22.2	26.7	83.8	26.7
Oaledonia	Oct.	1912	21.7	96.7	48.0	06.7
		1915	7489.2	2,220.0	1.320.1	2,220.0
Chathan	Fob	- N N			55.1	67.7
Chippswa	Sep (1911	142.5	57.7	^	
Clinton	March		98.5	171.7	128.1	167.0
Comber	May	1915	19.3	107.6	45.8	107.6
Dashuq od	Sopt.	1917	46.5	48.5	47.2	48.5
Dolaware	March	1915	7.4	12.4	8.9	12.4
Dereham	Sept.	1919	56.7	81.9	69.3	81.9
Dorchoster	Dec.	1914	15.1	26.9	19.7	25.9
Dray ton	March	1918	45.9	52.0	49.6	51.1
Dresden	April	1915	62.5	211.9	128.2	192.2
Drumbo	Dec.	1914	14.2	23.6	17.7	23.6
Dublin	Oct.	1917	24.7	27.8	26.4	87.8
Dundas	Jan.	1911	491.5	2,094.4	1,077.8	1,172.0
Dunnville	Jung	1918	194.5	251.1	227,4	251.1
Dut ton	Sapt.	1915	41.6	207.2	73.7	107.2
Elmira	HOY.	1913	64.7	296.7	159.2	296.7
Elera	Nov.	1914	57.4	197.5	153.3	197.5
Embro	Jan.	1915	20.3	46.7	31.9	46.7
Rtobicoke	Aug.	1917	134.4	352.3	241.9	352.3
Exeter	June	1916	95.7	170.4	142.9	178.4
		1914	97.1	183.1	128.6	185.1
Forgus	Nov.			119.6	107.5	119.6
Porest	March		98.5			
Galt	May	1911	767.5	2,673.7	1,925.9	8,673.7
Goorgatown	Sept.		104.6	539.2	359.9	539.2
Glonece	Aug.	1920	70.9	70.9	70.9	70.9
Goderich	Feb.	1914	207.5	450.2	320.8	450.2

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OPY FOR ENCLOSURE TO

	Date !	Power	Yearly	Yearly	Average	1921
	Wat		mum in ik	Maximum	Yearly Load	Actual
Municipality	First	Taken	Load	Load	to Oct.51,	Lo sa
			N.Z.	_ X.P.	1921 - H.F.	Here.
Grant on	July	1916	12.0	46.0	35.1	46.0
Suelph	Dec.	1910	1.436.4	3,860.9	2,495.8	3.860.9
Eagor sville	Jept.	1913	90.6	349.5	153.6	349.5
Hamilton	Feb.	1911		17.415.5	10,287.2	15,995.7
Harriston	July	1916	66.2	233.8	138.1	218.4
Hensall	Jan.	1917	44.2	83.8	59.3	54.1
Hespeler	Pob.	1911	207.6	434.4	321.1	388.5
Highgate	Dec.	1916	45.5	52.8	49.2	45.8
Ingersoll	May	1911	453.6	1.057.0	751.5	981.9
Kitchener	Jan.	1911	1,557.2	6,291.6	3,548.8	6,291.6
Lamboth	April	1915	18.4	27.7	18.5	27.7
Listowel	June	1916	147.5	476.4	319,3	476.4
London	Jan.	1911		12,565.2	7,649.6	12,365.2
Lucan	Yeb C	TIGE	D 1.2	194.3	123.6	194.3
Lynden	Nov.	1616	173.8	100.8	87.0	100.8
Markham	April	1920	53.2	53.2	53.2	53.2
Milton	apr 11	1915	219.8	720.7	408.5	658.2
Milverton	June	1916	100.9	284.3	232.5	277.0
Mimico	May	1912	55.9	400.0	105.7	400.0
Mitchell	Sopt.	1911	114.9	187.6	159.4	187.6
Moorefield	March	1916	26.5	28.0	27.4	27.9
Sount Brydges	March	1915	25.2	28.8	25.8	27.0
New Hamburg	March	1911	90.6	226.2	160.7	226.2
New Toronto	Peb.	1914	36.3	3,952.2	1.764.2	2,924.5
Miagara Falls	Dec.	1915	2,114.7	3,457.5	2.734.0	3,457.6
Hingara-on-	- W. W. W	THE SET HER THAT		0 9 20 1 20	- 410490	m # mm : 4 m
the-Lake	Aug.	1919	165.8	192.2	174.0	182.2
Norwich		1913	88.9	253.9	163.6	255.9
Oil Springs	Feb.	1916	94.0	119.5	108.8	119.3
Ottorville	Feb.	1916	12.5	37.0	25.6	87.0
Palmerston	July	1916	84.4	190.2	117.5	190.2
Paris	Feb.	1916	325.5	671.7	491.2	671.7
Parkhill	May	1920	54.2	54.2	54.2	54.2
Petrolia	May	1916	250.2	509.2	409.6	509.2
Plattsville	Dec	1914	28.1	79.5	46.9	28.1
Port Greatt	Aug.	1912	37.9	114.7	63.9	114.7
Port Stanley	Apr 11	1912	68.7	195.7	115.6	195.7
Preston	Jan.	1911	704.4	1.558.6	1.069.3	1,552.6
Princeton	Jan.	1915	10.3	16.1	12.0	16.1
Ridgetown		1915	87.8	191.9		
Rockwood	Dec.	1913			136.1	191.9
	Sept.	1917	25.5	55.2	35.8	55.2
Rodney	30p.	****	24.0	61.8	46.6	61.8

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	Date 1	Comer	Idarly	Yearly	Average	1921
	was	3	Minimum	Maximum	Yearly Load	Actual
Municipality	First	Taken	Lond	Load	to 00t. 31,	Load
			N.Z.	Hala	1921 - 11.2.	Halla
St. George	Sept.	1915	34.1	78.0	55.9	75.5
St. Jacobs	Sept.	1917	60.0	74.9	\$8.6	74.
St. Hary's	May	1911	296.8	910.4	648.7	910.
St. Thomas	Apr il	1912	1,039.9	2,373.7	1,798.7	2,349.
Sarnia	Dec.	1916	1,084.2	2,861.5	2,142.0	2,861.
Searberough	BOY.	1920	169.2	169.2	169.2	169.
Seafor th	Mov.	1911	194.9	571.8	323.9	386.
Simooe	April	1915	100.6	233.4	152.5	233.
Springfield	AUE.	1917	24.4	26.6	29.0	36.
Stamford Twp.	HOV.	1916	354.2	438.6	388.7	438.
Stratford	Jan.	1911	697.7	2,216.1	1,348.0	2,216.
Strathroy	Dec.	2924	164.9	394.7	278.3	394.
Paviatock	Mov.	ويدر	245.7	270.3	253.4	270.
Thamesford	Peb.	1914	22.0	93.3	55.1	93.
Thamesville	Oct.	1918	37.2	74.4	49.0	74.
Thorndale	Harch	1914	15.0	72.2	39.7	51.
Tilbury	April	1915	57.8	148.0	84.0	148.
Fillsonburg	Aug.	1911	191.0	706.1	376.1	410.
Toronto	June	1911	16,065.0	58,136.3	40,468.1	58,136.
Toronto Twp.	Aug.	1918	86.0	246.6	138.5	246.
Walker Ville	How.	1914	1,253.9	3,472.8	2,626.0	5,472.
Wallageburg	Pob.	1915	230.1	806.6	551.3	734.
atordown	Nov.	1911	36.5	228.7	77.4	125.
laterford	april	1915	47.4	138.0	103.3	123.
Waterloo	Dec.	1910	427.8	1,296.0	813.2	1,296.
Watford	Sapt.	1917	47.0	71.1	56.2	71.
Felland	Sept.	1917	1,736.0	3,257.5	2,659.7	1,736.
wellesley	Hov.	1916	115.4	125.6		119.
Westen	Aug.	1911	154.8	983.3	519.8	907.
West Lorne	Jan.	1917	25.7	152.4	72.0	152.
Windsor	Oct.	1914	1,312.7	4,957.5	2.495.3	4,957.
Woodbridge	Dec.	1914	70.9	168.1		166.
Woodstock	Jan.	1911	908.7	1,718.1		1,718.
Froming	Mov.	1916	25.5	48.2		42.
Zurich	Sept.		49.0	61.0		58.
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per herse-power for power taken by each of the municipalities on the Siagara System during the period of full
years' operations to October Slat. 1921. It is to be
noted that the 1921 actual costs per horse-power exceeded
the average costs in the majority of the municipalities.

		48163			
	Yearly	Yearly	Yearly	1921	
	Minimum	Maximum	Average	actual	
	Actual 90	Actual 185	Astual a'76	Cost	
Hunicipality	Jost per	Cost per	Cost per	per	
	H.P.	H.P.	N.P.	H.P.	Martin and on the Company of the Company
	COI				
Aoton:	\$266.55	\$40.74	\$31.45 /	\$34.87	
Ailsa Graig	36.18	110.87	43.95 /	45.88	
Aylmer	44.50	44.82	44.65	44.59	
Ayr	41.91	53.05	45.80./	43.50	
Baden	25.15	37.06	29.20 /	31.65	
Beachville	22.04	32.64	27.39 7	32.84	
Blemheim	45.58	59.55	48.85	49.00	
Bolton	42.63	56.25	49.40	50.02	
Bothwell .	48.73	105.02	59.85 V	49.85	
Brampton	18.60	25.31	21.61	23.84	
Brantford	15.58	21.30	18.73	20.62	
Brigden	52.15	62.50	88.65	62.50	
Bur ford	58.08	76.76	63.90	76.76	
Burgessville	41.12	46.68	45.32	47.13	
Caledonia	20.45	24.89	23.14	24.59	
Chatham	24.15	40.95	26.81	26.24	
Chippawa	16.49	20.74	19.10	20.74	
Clinton	36.86	46.50	41.91	42.69	
Comber	48.70	118.56	64.88	50.31	
Da shwo od	50.05	64.64	54.76	64.54	
Delaware	47.00	83.11	62.91	68.77	
Doreham	34.33	37.90	36.44	37.90	
Dorchester	35.81	47.17	41.36	47.17	
Drayton	64.00	66.74	65.74	66.60	
Dresden	30.09	57.93	34.93	33.51	
Drumbo	35.32	66.19	47.20	46.11	
Dublin	47.09	78.81	60.55	78.81	
Dundas	13.27 3	17.79 "	14.98 88	17.79	
Dunnville	41,21	46.76	42.97	41.21	
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	Yearly	Tearly	Yearly	1921
	Minimum	Max1mum	AVOTAGO	ac tual
	As tunl	Actual	Actual	Cost
Eunicipality	Cost per	Cost per	Cost per	pe r
	N. P.	11.2	L.P.	1.2.
Dutton	\$34.77	955.17	840.82	\$59.63
Elmira	29.89	41.69	34.95	32.93
Elora	30.55	44.20	35.61	40.00
Embro	59.97	107.94	74.09	69.60
Etobicoko	19.75	22.89	21.76	22.0
Exeter	36.40	58.39	42.79	47.3
Forgus	33.67	40.04	57.72	40.0
Forest	53.58	58.05	56.39	56.9
Galt	17.62	23.50	20.64	23.5
Georgetown	29.79	60.36	34.98	39.6
	71.53	71.53	71.33	71.5
Blençoe Goderich	41.90	55.53	48.56	49.8
Granton	40.96	96.01	80.40	45.6
uelph	27.77	21.08	19.35	21.0
Eagorsville	30.92	25.88	33.05	31.9
Eamilton	13.30	17.51	15.32	17.5
Earriston	40.23	71.02	47.80	40.2
Hensall	47.70	62.19	53.55	62.1
Hespelar	17.50	26.24	21.53	26.2
Righgate	49.05	52.59	50.59	49.1
Ingersoll	20.36	27.72	23.39	25.6
Kitchener	18.25	21.51	20.01	21.5
Ramboth	53.06	67-10	61.00	67.1
Listowel	32.54	41.67	34.64	32.5
London	17.65	22.26	19.95	21.0
Lucan	25.94	59.15	32.90	33.7
Lynden	39.53	44.06	41.39	45.5
Karkham	54.11	54.11	54.11	54.1
Milton	24.38	30.77	26.53	27.7
Milverton	28.50	30.89	31.48	31.2
Mimico	20.51	32.09	22.67	23.3
Mitchell	29.04	37.61	33.41	32.8
Moorefield	64.60	70.65	67.40	66.4
Mount Brydges	49.73	69.62	58.99	69.6
Now Eamburg	29.42	40.60	32.64	33.7
New Toronto	20.18	26.15	22.78	26.1
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the-Lake	18.58	25.35	21.86	18.6
Norwich	28.47	42.03	35,16	34.7
Oil Springs	37.45	44.49	40.75	40.9
Otterville	41.26	47.40	43.75	45 . 3
Palmerston	36.49	51.71	41.28	36.4
Paris	16.18	22.21	19.35	20.6
Parkhill	67.25	57.25	67.25	67.2

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	Yearly	Yearly	Yearly	1921
	Minimum	kaxi mum	Average	actual
	Actual	Actual	Actual	Cost
Municipal ity	Cost per	Cost per	Cost per	Dea.
	н. Р.	H.P.	H. P.	H.P.
Petrolia	\$30.77	\$42.38	\$32.71	\$30.77
Plattsville	80.78	105.72	65.95	86.77
Port Gradit	20.12	32.72	24.24	27.95
Port Stanley	40.91	58.56	46.14	41.43
Preston	16.51	22.49	19.59	22.49
Princeton	77.21	119.45	94.61	96.11
Ridgetown	39.83	52,13	42.05	41.04
Rockwood	40.44	78.64	48.83	53,33
Rodney	41.93	60.40	47.28	41.93
St. Coorge	31.76	49.57	39.22	39.99
St. Jagobs	29.87	34.87	31.77	54.61
St. Mary's	24.88	31.50	29.13	30.32
St. Thomas	22-66	20.30	24.63	25.89
Jarnia	30.34	35.64	31.81	30.34
Bearborough	37.79	37.79	87.79	37.79
Seaforth	30.31	48.93	87.29	48.98
31 mg 00	21.74	36.87	26.61	30.40
Springfield	50.40	43.49	26.69	54.63
Stanford Twp.	11.20	16.19	14.42	15.45
Stratford	22.30	28.46	25.62	26.5
Strathroy	29.93	40.14	34.75	35.56
Tavistock	28.64	33.11	31.57	33.00
Thamesford	38.74	65.58	47.78	49.8
Thames ville	44.88	64.06	52.13	49.0
Thorndale	43.29	96.26	56.57	77.6
Tilbury	37.67	60.06	46.02	40.1
Tillsonburg	27.03	40.16	31.64	84.9
Toronto	12.40	18.36	15.28	18.3
Toronto Twp.		26.81	24.28	26.8
Walker ville	19.79	44.17	34.12	31.7
	30.72	53.22	34.07	
Wallacoburg				83.1
Water down	25.04	32,96	29.62	31.4
Water ford	26.61	57.80	29.93	34.4
Waterloo	10.65	21.85	20.28	21.6
datford	77.89	90.98	84.13	77.8
Welland	13.55	17.07	18.08	17.0
Wellesley	52.01	39.03	35.60	39.0
Weston	21.29	41-89	34.76	24.9
West Lorne	33.77	48.95	50.47	35.7
Windsor	29.75	46.17	35.00	29.7
Woodbridge	29.52	33.55	31.47	32.7
Woodstook	17.75	22.68	20.88	22.8
Syoning	49.60	61.58	53.82	50.0
Eurich	55.60	70.06	59.79	70.0

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A report prepared by Mesers. Price, saterhouse & Company is submitted herewith showing a comparison of the actual estimates submitted to the municipalities with the actual loads and costs for each of the years from the inception of the system to October Slat, 1921.

MIAGARA RURAL LIMES

Capital Investment

October 31 st. 1921, comprised the following:

Primary and main lines owned by
the Commission but operated and
maintained by municipalities
owning secondary or service
lines tributary thereto

3434.482

Rural lines eperated by the Commission

27,068

P.W.

Lines under construction

14.676

2 otal -

3 476,486

Reserve for Renewals

additions to the reserve for renewals in respect of rural lines operated by the Commission at its own
risk are provided by an annual charge of 4% on the capital
invested, with interest added thereto in each year at the
rate of 4% on the balance in the account at the close of the

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preceding year. This method of provision, which is equivalent to a renewal rate of approximately 52% per annum, on the so-called "Straight Line Basis", would replace the amount of capital investment being reserved for in about P.W. 139.10 18 years.

p.26.

No provision for renewals in respect of rural lines constructed at the cost of the Commission and operated by municipalities has been made in the accounts of the Commission, since, under the terms of their agreements, such nunicipalities are required to set aside a renewal fund at the rate of 5% per angum on all capital expenditures by the Commission on lines of primary voltage. The funds thus set aside are retained by them for renewal of proporties of the 144 C 3 8 8 1 Commission which they operate.

A summary of the reserve for renewals of the Miagara Rural Lines is as follows:

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Market State and the line market 12 feet and 30 feet annual 2.

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AND REAL PROPERTY AND ADDRESS OF TAXABLE PARTY AND ADDRESS OF TAXABLE PARTY.

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Conoral Economics

Section 4 1

	Ported		Provision of 4%	Interest	Together
foor on foor on	ding Octo ding Octo ding Octo		\$2,669.74 1,196.35 787.71 836.44 811.76 896.69	\$ 53.17 108.92 189.30 159.14 198.92 239.34	\$2.722.91 1.397.27 927.01 994.58 1.010.68 1.133.93
	Tota	1 Oredite	37,199.89	\$896.79	\$8,098.58

Reserve for Sinking Pund

above charges

forred from system Jost of renewing and replacing equipment Interest applicable

Balance as at October 31st, 1921

The Commission is required under the Power Commission act to provide "an annual sum sufficient to form in thirty years, with interest at four per cent. per annum, a sinking fund for the repayment of the advances made by Unterlo under this Act for the payment of the cost of the works".

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The balance in the account of the reserve for sinking fund at the close of each fiscal year is as follows:

Tanitono?	general est		
19.ENY.10 PE.TRS.1 2E.TAW DELET DELETT DELETT DELETT	YEARD 0 28.984 28.786 31.854 28.881 45.853		
36,690,36	(1740-194)	93.00E, TV	

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				Balanco			
October October October October	31, 31,	1918 1919 1920	授款	\$19,547.66 26,067.39 56,456.61 46,809.11 50,607.68	√₩'.	, pA ₄ =1A	P.V. p. 28

Of the total sinking fund of \$50,607.68 at
October Slat, 1921, \$48,577.16 is in respect of lines which
will eventually become the property of the townships in
which they are operated, and \$2,030.52 is in respect of
eight lines operated by the Commission at its own risk.
He portion of the sinking fund for Hingars Hural Lines stood
deferred at October 51st, 1921.

Operating Accounts

A list of the municipalities and others served by the Niagara Rural Lines is included as Exhibit VIII of Heasrs. Price, Saterhouse & Company's report on the Niagara System, dated October 9th, 1922.

A summary of the operating account of the Niagara Rural Lines for the four years ending October 31st, 1921, is as follows:

Disput large major biretomently by the production on the con-

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Yos 1916	r ending 1919	Cotober 1980	31. 1921
\$3,543	\$3,915	34,522	\$5,328
41		\$5,029 1,968	\$3,191 2,318
\$3,892	\$4,225	\$4.997	\$5,509
\$350	\$310	\$475	\$181
	\$3,543 \$1,953 \$1,953 \$3,892	\$3,543 \$3,915 \$1,953 \$8,227 1,939 1,998 \$3,692 \$4,225	\$3,543 \$3,915 \$4,522 \$1,953 \$8,227 \$5,029 1,939 1,998 1,968 \$3,692 \$4,225 \$4,997

Municipalities not operating at risk of Commission -

ed Link or Americat

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Expenses
Operating cost including
power purchased
Fixed Charges

Total Expenses

Balance -

\$105,605 \$63,443 \$90,770 \$93,124

\$75,509 \$51,709 \$59,238 \$64,012 \$0.096 \$1,734 \$1.532 29.112

\$103,605 \$63,443 \$90,770 \$98,124

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p.29

Of the municipalities operating and maintaining the lines held under trusteeship by the Commission, sufficient charges were made against them to cover sinking fund and interest, and also the cost of power in the case of five of them.

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which were charged direct with the cost of power furnished. Those not charged direct by the Commission with the cost of power, receive power from, and make payment therefor to municipalities to which they are adjacent. The lines operated by the Commission at its own risk showed a deficit each year for the four years ending October 31st, 1921, although from the commencement to October 31st, 1921, the operation of these lines resulted in a surplus of \$1,590.47.

P.T.

municipalities and townships operating lines on their ewn account, twenty-mine had betther debit nor credit balances, and four had credit balances aggregating \$1.022.31, representing accounts payable to them by the Commission. Of the eight lines operated at the risk of the Commission, seven lines showed a surplus of \$2,325.96, and one line a deficit of \$733.49, or a net surplus from operations of \$1,590.47, mentioned above, which latter amount represents a surplus account in the balance sheet of the Commission.

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General aconomics
Section 2

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Puture Operation

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The acquisition and construction by the Commission of three large development plants at Riagara Falls within the past five years, involving an investment in excess of \$100,000,000, renders a discussion of the future operation of the Riagara System in combination with those development plants a matter not only of unusual interest but of considerable importance.

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It has been noted that the system designated in the reports and records of the Commission as the "Biagara System" consists only of the transmission and distribution lines and other accessories delivering power from Niagara Falls. The figures and data given in "Jeneral Economics", Section \$ 1. of this report relate only to the operation of the system for the period ending 31st October, 1921. The Miagara System in the future, however, may be comprehended to include the three development plants at Miagara Falls, nominally owned by the Commission; one small generating plant at Erindale on the Credit River; a steam driven reserve power plant in the City of Toronto; a potential supply

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of purchased power from the Canadian Niagara Power Company at Niagara Falls; and the transmission and distribution
lines of the Niagara System proper. There are, in addition,
distribution systems known as the Hasex and Thorold Systems,
which will probably lose their identity and become part and
parcel of the Niagara System in the very near future. For
the sake of convenience the Niagara System proper is hereafter referred to simply as the "Niagara System" and the
Niagara System, as including all works developing and
delivering power from Niagara Falls, other than the so-called
Essex and Thorold Systems is referred to as the "Greater
Niagara System".

The Ontario Power Company has been treated by the Auditor of the Commission as a "work" of the Commission within the meaning of the Power Commission Act since the 1st of November, 1921. In effect, therefore, the Ontario Power Company and its transmission system is already a part of the Miagara System. The same principle should be adopted, and no doubt it will be adopted, in dealing with the Queenston-Chippawa Power Development, the Toronto Power Company and its subsidiaries and such other works as are acquired or constructed from time to time for the purpose of supplying power from Miagara Falls.

This Commission has been impressed with the necessity of an examination of the probable conditions that

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will obtain in the operation of the Greater Miagara System in the future in view of the fundamental changes which have been or may be made in its constitution. The figures and data contained in "General Boonomies", Section # 1, as to the operation of the Riagara System prior to 31st October, 1921, do not, as in the case of all other systems of the Commission, afford adequate information upon which a forecast of the future operation of the Greater Miagara Bystem may be based. the year 1922, the Queenston-Chippawa Power Development commenced to deliver power, and, in the same year, the Commission took over the Toronto Power Company including the plant of the Electrical Development Company of Miagara Falls, so that the operating figures and costs up to 1921 furnish, in themselves, but slight assistance in computing figures and cests for 1922 and subsequent years. No report on the Niagara System would be complete without an examination of such new and important factors. Instructions were accordingly given to walter J. Francis & Company, our Consulting Engineers, to prepare a supplementary report dealing with the ongineering economics of the system in respect of the future operations of the generating plants at Biagara Falls in combination with the Hiagara System. This report was duly prepared and presented under the title "Engineering Data Moonomies and H.B.P.C. Distribution Systems, Study of Miagara System, Part Two. being for period commencing November 1st, 1921".

reports, referred by he is more charges, here works to

SATISF STREET, SALES OF SECURE AND TO PROPERTY OF SECURE ASSESSMENT AND ADDRESS OF THE PARTY OF in the future in view of the functionic change which have And removed not be about the last season that you was not need to season and data contained is "concept Macananiae", decitou & 1, as to the ASSESSMENT AND ADDRESS OF OWNERS STREET, NAME AND ADDRESS. TWO. ARRESTANCES OF THE RESIDENCE VALUE OF THE THE PARTY HAVE NOT THE RESIDENCE OF PROPERTY AND DESCRIPTION OF STREET OF STREET, SEPTIME ARREST OF AN APPROXICATION OF THE PARTY OF THE PA THE PARTY LANGE VALUE OF THE PARTY NAMED AND ADDRESS OF THE PARTY AND NAME AND ADDRESS OF TAXABLE PARTY ASSESSED. NAMED AND POST OF TAXABLE PARTY. and read on the contract to be dealer translations Individually special allegates and wants on they desired the annual and sections. AND DESCRIPTION OF THE PROPERTY AND PERSONS AND PERSON diver no and all on the stores on the Hisparia Grand on start would describe many to annihilations are present a subject as of angline of wealth frames comes and a contract of the contra B owners of acrossinal and leaders for the party and a NATIONAL AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS. and he sent strongs wouldn't not not not paragraph of markets and he 金信日 間付まる 経行まる 経りまたのなる おは のままなる おは かない しょう こう こうこう こうこう Less working has been a stated a supplemental and the state of the sta .C. C. Des maimonaph neut haives I see H. S. D. D. obac sand ourself named as as as "以其所有其 "事实文 还有物理经典教理

In addition to the report of the Consulting

Engineers, above referred to, Mesers. Price, waterhouse

à Company, the accountants of this Commission, have prepared miscellaneous studies which are included in this

Power Load

In dealing with the combined operation of the plants in the Biagara District, our Consulting Engineer traces the growth in the power loads required by the system. His figures show that there has never been a surplus of power and that the growth has been generally regular and repid. In stamming up the conclusions arrived at, our Consulting Engineer states as follows:

"As a result of these investigations, it would appear that on the whole a growth of about 10% per annum may be expected in the Miagara District during the next decade or so If this indication be confirmed, it will not be very long before the whole of the generating plants now completed or under construction on the Canadian side at Miagara Falls will be loaded to full capacity, and further sources of power supply must then be obtained if the industrial growth of the Province is to be maintained. It would, therefore, seem prudent to undertake studies of all feasible projects in the Miagara peninsula for still further increasing the available power supply and to have plans outlined for further developments before the time when the capacity of the Queenston-Chippawa plant will have been reached, probably within a comparatively few years."

WJF. Pt.II p.9814.

Included as page 12 of the Consulting Engineer's report, referred to, is a curve showing "Peak Loads in

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Electrical Horse-power" on all the systems of the Commission from the year 1911 to the year 1922. From an examination of this chart, it is apparent that the Miagara System together with the systems of the Ontario Power Company and the Electrical Development Company represent a power load of about 550,000 hor se-power out of a grand total for all systems of about 640,000 horse-power. on the continue

It is likewise evident that the muhicipalities and private oustomers receiving power from Niagara Falls consume about 86 per cent. of the total power supplied by the Commission throughout the whole Province.

or Development Plants Combined Operations

In discussing the combined operation of all plants in the Riagara District, the Consulting Engineer states in his report as follower falls and as as

"Many factors enter into the problem of utilizing the existing plants and future plants to best advantage. There is a large amount of cupital invested in the first three older plants mentioned. All are in good condition. Built during times when capital costs were relatively low, the construction costs of the three plants represent an investment of a comparatively small aum per horse-power."

WJF. Pt.II p.14.

He then proceeds to set forth on page 15 of his report a "Table of Power Output of Your Power Plants at Miagara Falls". This table does not include the Queenston-Chippawa Power Development. In summing up, he states as follows:

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"It would appear that the most efficient use of
the four class plants on the Canadian side
would probably be at an output of about 350,000
horse-power requiring approximately 27,000 cubic
feet of water pur second; that the present normal
use of these four plants at about 400,000 horsepower requires approximately 33,000 cubic feet
per second and that the peak capacity of the four
plants would give an output of about 450,000
horse-power, requiring about 37,000 cubic feet per
second. The figures for peak capacity are in
excess of what could be obtained continuously and
they represent really the peak capacity of the
four plants individually."

Pt.II

The Consulting Engineer next deals with the Queenston-Chippawa Power Development and hereunder is submitted a table prepared by him, showing the possible output of the Queenston-Chippawa Coder Development with various amounts of water available under the assumed head of the plant, namely about 505 feet, operating at an overall efficiency of about 90%, which efficiency it is stated has recently been demonstrated by tests.

Power Available at Queenston-Chippawa Power Development. 305 Feet Read - 90 Per Cent. Efficiency

Flow	Flow Electrical		Flow		Electrical		
jubic le	at		H. P.		Cubic Fe	et	H.P.
99r 3000	nd	A	vaila ble		per Becc	and	Aveilable
5,000			157,000		13,000		407,000
6.000			188.000		14,000		438,000
7.000			229,000		15,000		470,000
8,000			250,000		16,000	****	500,000
9,000			282,000		17,000	40000	532,000
10,000			313,000		18,000	****	565,000
11,000			344.000		19,000		594,000
12,000			375,000		20,000		

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Combining the operation of the four clear plants with the operation of the Queenston-Chippawa Power Development. three tables on various bases are presented as follows:

1. Condition of "Probable Most Efficient Use"

otal Water	Tood P	our Plants Water Used		<u>abination</u>	Water U	30 Plant
Cubic Re	ot	Onbic Feet		Horse-	Cubic Pe	est Horse-
Per Boo		Per Second	And the second of the second s	Rower	29r 5900	ind Power
36,000	*****	27,000		\$50,000	9.000	282.000
40,000	*****					407,000
45,000	440640					**** 565,000
50.000	*****					720,00
55,000	*****	-27,000		350,000	25,000	*** 875,00

2. Condition of Ordinary Present Use"

Potal Water		ur Phant	the same of the sa	mbination	a 305-700t Tater Us	90 S Plant
Cubic Fe	ot '	Oubic Te Per Seco	ot i	Horse-	Oubic Fe	et Horse-
36,000	****	33.000		400,000	3.000	**** 94,000
40,000	*****	33,000			7,000	229,000
45.000		33,000			*** 12,000	375,000
55,000	*****	33,000			22,000	686,000

3. Condition of "Possible Maximum Use"

white the contradiction of t		s in Combina	tion 305-Foot	90% Flant
Total Water Use Cubic Feet	Oubic Ve	at Hor		et Horse-
Per Second	Per Seco	nd Powe	Per Deco	nd Power
36,000	37,000	450,	,000	0 1 0
40,000	37,000	***** 450	000 5,000	*** 94,000
45,000	57,000	450,	000,8 000,	*** 250,000
50,000	37,000	450,	,000 13,000	407,000
55-000	37,000	4.50	000 18.000	563.000

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Our Consulting Engineer then states:

"Summing up the above information, we obtain
the following figures as representing the
total output for the assumed flows tabulated,
when used in the four Janadian plants now
existing in combination with the queenstonChippawa plant or an extension the reof:

	Cubic Fe		t Probable		At Ordinary		Possible
-	Yer Seco	1816	Efficient	<u> </u>	Present Use	BAX	Laun Voe
	36,000		632,000		494,000		438,000
	40,000	*****	757,000	*****	629,000		544.00
	45,000	*****	913,000		775,000		700,00
	50,000	*****	1,070,000		932,000		857,00
	55,000	*****	1,225,000	*****	1,086,000		1,013,00

"From these Cigare lit will be seen that with a total diversion on the Canadian side of the Riagara kiver amounting to 45,000 cubic feet per second, the four plants on the Canadian side, namely, the Canadian Riagara, the Bleetrical Development, The Ontario Power and the International Railway could deliver about 560,000 horse-power and leave enough water to generate efficiently about 563,000 horse-power at the Queenston-Chippawa plant, or a total from all five plants of about 915,000 horse-power."

"The last table indicates the advisability of operating the queenston-Chippava plant to its maximum, leaving the less efficient plants to use the balance of the available water. At the same time the table serves to emphasize the statement made in the early part of this report that the practical handling of the co-related plants is the only proof of the maximum capacity and efficiency of the group for any stated quantity of water."

WJF. Pt.11 p.19 & 20.

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Capital Investment

The capital investment in the Greater Miagara System as of 31st October, 1922, may be briefly classified as follows, (cents omitted):

- 1. queenston-Chippews Power Development \$65,642,616
- 2. Ontario Power Company Development
 Plant, including Third Pipe Line,
 transmission lines and subsidiaries 25,405,677

formula band of depolarization in or

Queenston-Chippawa Power Development are set out in this
Commission's report upon that development. A complete analysis
of the investment of the Ontario Power Company is given in this
Commission's report entitled "Report on The Ontario Power
Company of Ningara Falle". It is impossible to procure a
detailed statement of the investment in the works of the
Torente Power Company and its subsidiaries, but the figures
employed herein are substantially correct. The preceding
section of this report, "Coneral Economies", Section \$ 1,
gives in detail the particulars of the capital investment
in the transmission lines and transformer stations of the
Riagara System.

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Associate Street, such as we were Charles and performance of the contract of erran increatived word armeldi-more mousi a & SIA, SAG, SAS PRINCIPLE SERVICE STREET, PARTIES Plant, October 1914 Plan Line, tringentialing lines from some or in sufficient SYNTHERMAN 1.0 MALANTANE ANDRONE WATER MARKET. Revelopment Company and brancolowed 100 752 23 посрудання по виз та SHOPPING THE PROPERTY. The first of the same of the same

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The nature of the liability of the Commission and the Province in respect of the capital investment in the Greater Riagara System may be conveniently summarised as follows. (cents omitted):

CHEST PROPERTY AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND

2.	Cash Advances by the Province, in respect of the Queenston-Chippawa Power Develop- ment, the Third Pipe Line of the Ontario Power Company and the transmission lines of the Niagara System
2.	Suarantees by the Province. in respect of the payment of outstanding bended indebt- edness of acquired properties
4.	Guarantees by the Commission, in respect of bonds of the Torento Power Company— not guarantee phyprovince
	2 0 t a 1 \$134.034.675

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of the Commission throughout the Province, including the Contral Ontario System, amounts to approximately \$165,000,000. With the capital investment in the Greater Miagara System reaching \$134,000,000, it is apparent that about 80 per cent. of the total investment in Mydro undertakings is represented by the investment in mydro undertakings is represented by the investment in works developing and transmitting power from Miagara Palls. Comparing the investment in the Greater Miagara System with the investment in the power undertakings of the

 $(a,b,a,a,b) \stackrel{\mathcal{L}}{\rightarrow} \{(A,a,b,a,a,b,a)\} \in \mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L})(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L})(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L})(\mathcal{L}_{\mathcal{L}}(\mathcal{L}_{\mathcal{L}}(\mathcal{L})(\mathcal{L}_{\mathcal{L}}(\mathcal{L})(\mathcal{L}_{\mathcal{L}}(\mathcal{L})(\mathcal{L}_{\mathcal{L}}(\mathcal{L})(\mathcal{L}_{\mathcal{L}}(\mathcal{L})(\mathcal{L}_{\mathcal{L}}(\mathcal{L})(\mathcal{L}_{\mathcal{L}}(\mathcal{L})(\mathcal{L}_{\mathcal{L}}(\mathcal{L})(\mathcal{L}_{\mathcal{L}}(\mathcal{L})(\mathcal{L}_{\mathcal{L}}(\mathcal{L})(\mathcal{L})(\mathcal{L}_{\mathcal{L}}(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L})(\mathcal{L}$

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Commission, exclusive of the investment of the Province in the Central Ontario System and the investment in the electrical railways of the Commission, this percentage is ineroused to over 91 per cent.

The capital investment in the Greater Hisgara

System is unique in that only 63 per cent. of the investment

is represented by cash advances by the Province, whereas in

the case of every other system, except Huskeks. Thereld and

Hissex, the total capital investment is represented by funds

paid over to the Commission by the Province.

Debentures issued or bonded indebtedness assumed by the Commission and guaranteed by the Province and bank loans in respect of the Greater Miagara System total over \$36,000.000. and represent about 27 per cent. of the total capital investment. The balance of about 10 per cent. is represented by the \$8,264,700 bonds of the Toronto Power Company, payment of which was assumed directly by the Commission and not guaranteed by the Province, and an amount of \$4,564,670 representing meneys expended on the queenston-Chippawa Power Development out of the General Funds of the Commission in excess of advances therefor by the Province. The General Fund of the Commission must be reimbursed to the extent of the expenditure therefrom, and, unless the Commission is authorized to borrow money on the security of its own bonds, the usual course will be followed and funds will be advanced by the Province to cover the deficiency.

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rantesian, exclusive of the investment of the Province in the Control Outario System and the investment in the clopsrioul railways of the Commission, this personning is inerenord to over \$1 nor cont.

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In considering the future operation of the Greater Mingara System, it is not remarkable, in view of the enormous capital investment in the system. that the interest and attention of this Commission has centred upon the basis adopted or proposed for repayment of the investmont. On the one hand, the municipalities are vitally concorned with the nature and bases of the sinking funds and renewal funds established by the Commission because annual charges in respect of these funds are immediately reflected in their annual power bills. Moreover, under the general scheme of the Power Comission act, the municipalities are supposed to acquire a growing equity in the works serving them, and, at the end of a thirty-year or a thirty-five-year period, to own such works outright. On the other hand, the Province has advanced to the system, directly or indirectly, an amount in excess of \$120,000,000, or almost half of the total Provincial dobt, and, under the general provisions of the Power Commission Act, these advances are required to be repaid by the municipalities on the termination of the thirty or thirty-five period.

the sinking funds established in connection with the works of the Greater Biagara System present many compit-cations and do not comply with the general sinking fund provisions of the Power Commission Act. Prior to 1917,

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throughout the Prevince, and up to the present time on every system. except the Misgars System and the Thunder Bay System where a forty-year sinking fund period was specially agreed upon and confirmed by the Legislature, the Jonni sion has collected annual sinking fund instalments on a thirty-year basis in accordance with the provisions of the general law. In 1917, the Ontario Misgara Development Act, 1917, was enacted, and the Commission has interpreted its provisions as varying the provisions of the Power Commission not and the terms of the contracts between the Commission and the municipalities to the extent of authorizing the Commission to establish sinking funds in respect of borks acquired or constructed under that est in such amounts and on such bases as may be nocessary and proper. Althout entering upon a discussion of the legal morits of such an interpretation, the following summary is presented to show the meture of the sinking fund provisions in force or proposed in respect of the capital investment in the Greater Hisgara System.

1. Queenston-Chlupana Power Dovelopment

\$65,642,616

This ambunt is or will be represented by cash advances from the Province. Assording to estimates submitted to our Consulting Angineer of the probable cost of generating power from this development, the Commission propaga to establish a sinking fund on a 40-year basis with 5-year deferment period.

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2. Ontario Power Company

(a) Third Pipe Line

\$ 3,514,676

This amount is represented by cash advances from the Province and loan from the Bank of Montreal and is being repaid on a 30-year basis with no deferment period.

(b) 40-year 45 Bonds of the Commission, is seed in connection with the acquisition of the capital stock of the Ontario Power Company

\$ 8.000.000

Sinking fund established in fiscal year ending 31st October, 1921, on basis sufficient to retire bonds at maturity - approximately a 37-year basis with a 5-year deferment period

(c) 20-year 5% Bonds of the Commission, Issued to retire bonds of the Ontario Power Company which makinged in 1921

\$ 5,200,000

Sinking fund established on basis of annual charge of 1% per annua with interest added annually at 4% (approximately a 41-year basis with no deferment period).

(d) First Nortgage of 5% Bonds of the Ontario

Power Company, maturing in 1945, payment

of which was assumed by the Commission and

guaranteed by the Province on acquisition

of the Company

\$ 9.092.000

The Trust Leed under which these bonds were issued requires an annual payment to the trustees to be applied as sinking fund equivalent to \$1.00 per h.p. generated and sold in the preceding year. Up to the present time the Commission has not included as an operating charge any amount for sinking funds in respect of these bonds and the initial payments to date have been taken, to a large extent, out of renewal funcs of the Company. Inasmuch as the Ontario Power Company may be said to be subject to the provisions of the Development Acts, the Commission may adopt the same basis as applied to Queenston-Chippews (1.). namely a 40-year basis with a 5-year deferment pariod.

T10 THE STREET, ST -is fore to borders by each aimort and long mad long from -ou market by Age, Lawrence by their act THE RESERVE DESCRIPTION OF REPORT OF RESIDENCE AND RESIDENCE. THE SOLLIES ALUMIN AND AND DURKER OF STREET, MINISTER OF THE STREET, MINISTER, nes to marrialized one distributed and saying event of the femorie form being STATE OF THE ar tooks drawanters are: to simple orlier of the Subv-76 a glatanina m ASSESSED THE RESIDENCE SANSON A MADE MADE Almost Andrea lang. and To should be touted a 181 STORY DESIRES OF THE PARTY OF NUMBER FOR SAME STATE OF STREET OF of the section that All to appears Language Interest solds unablackly us his GIOLEGICAL STREET, A GIRL GARAGES CONTRACTOR AND DESCRIPTION OF THE PACHE RESIDENCE OF SELECTION AND SECURISE PRESENTED AND AND LAND IN LAND. BASTONE had no implement by the Character of the late in and the first and the standards and the same side water 30,286,8 8 THE COMPANY usand osods dolds robes base daugt our sample Libral of medical decad sees -unit as helicity as he assisted and its of all the Coulous to black the Co. control of red wife in the properties petry of the best bearing the the CONSTRUCTION OF AN ASSESSED AND AND ASSESSED. ing charge our enough for sinking fracis balliff and the class would be danger to a of entire to date been been taken, to but he would downed by the process of the Company. Innamed as the Octobio Power bill by realist of or him of an anamal will all the Attendance of the angle of the second to the DESCRIPTION OF PARTY AND ADDRESS AND ADDRESS OF THE PARTY AND PART a and deposit to the state of t BERTEL ALGER ALICHE BARRETTE IN BIRRES · LELTER REPORT OF

(e) First Nortgage 5% Bonds of the Ontario Transmission Company, maturing in 1946, payment of which was assumed by the Commission and guaranteed by the Province on acquisition

\$ 1,599,000

The Trust Bood under which these bonds were issued requires an annual payment of \$30,000 to the trustees to be applied by them in the retirement of these securities. Up to the present time, the Commission has not included as an operating charge any amount for sinking fund in respect of these bonds and the annual payments have been taken to a large extent out of renewal funes of the Company. Inasmuch as the Ontario Transmission Company may be said to be subject to the provisions of the Development acts, the Commission may adopt the same basis as applied to Queenston-Chippews (1.), nemely, a 40-year basis with a 5-year deferment pariod

3. Poronto Power Company

(a) 20-year 62 Bonds of the Commission, issued in connection with the acquisition of the properties of the Toronto Power Company, maturing 1st Documber, 1940

\$ 619,000

It is understood that the Commission proposes to establish a minking fund on a 40-year basis with no deferment period from let December, 1320.

(b) 5% First Mortgage 30-year Gold bends of the Electrical Development Company, maturing lat March, 1933, payment of which was assumed by the Commission, but not guaranteed by the Province on acquisition of the Company

\$ 4,161,500

The Trust Deed hereunder requires an annual payment to the trustees of \$1.00 per h.p. generated and sold by the Company in the preceding year. It is understood, however, that the Commission proposes to establish a sinking fund on a 40-year basis with no deferment period.

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(c) 41% Consolidated Debenture Stock of the Toronto Power Company, maturing 1st May. 1941, payment of which was assumed by the Commission and guaranteed by the Province on acquisition of the Company

\$12,383,831

The Trust Deed under which this stock was is sued requires payment of £109.001:7s:3d, together with interest on the total amount of the issue annually. The sinking fund payments are to be applied in the retirement of securities and the interest applicable to the retired bonds is to be added to sinking fund and applied in the retirement of the securities. provision requires an approximate annual payment of \$500,000 per annum, an amount sufficient to retire the bonds at maturity. It is understood, however, that the Commission do not propose to provide this amount annually out of power costs, but will establish a sinking fund on a 40-year of becomed 1920.

(a) 55 Fortgage Bonds of the Forento Power Company, maturing 1st of July, 1924, payment of which was assumed by the Commission but not guaranteed by the Province on acquisition of the Company

\$ 4,105,200

There is no provision in the bond covenent in respect of sinking fund. It is understood, however, that the Commission proposes to establish a sinking fund on a 40-year basis with no deferment period.

4. Transmission Lines and Transformer
Stations of the Miagara System

\$21,718,851

The general provisions of the Power Commission act have been complied with, i.e., 30-year sinking fund basis with 5-year deferment period

\$134,034,674

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apparent that only the expenditure on the transmission lines and transfermer stations of the Hisgara System and the expenditure upon the Third Pipe Line of the Ontario Power Company are being repaid on the thirty-year basis contemplated by the Power Commission Let. Thus, out of a total capital investment in the Greater Hisgara System of \$154.034.674, only \$25,235,528 or about 19% is repayable on a thirty-year basis. This situation is of considerable interest in view of the conditions obtaining elsewhere throughout the Province.

The balance of the capital expenditure represented by each advance the Privince was employed in the construction of the queenston-Chippewa Power Development. As already pointed out, the Commission in estimates submitted to our Consulting Engineers has apparently decided to provide sinking fund on a forty-year basis with a five-year deforment period to repay the cost of this development. The capital investment in this development, as of October 31st, 1922, was \$65,642,616, or approximately 49% of the total capital investment in all works in the System. It is not jet finally completed, but the Commission's Engineers estimate the final cost with nine units installed at \$75,600,000. Accordingly, if no further expenditures are made, the total capital investment in the Greater Magara System on the completion of the Pasenston-Chippawa Power Development will approximate \$144,000,000.

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this amount, about 52% will be represented by each advances to defray the cost of the Queenston-Chippawa Power Development and 16% by each advances in respect of the Niagara System and the Third Pipe Line of the Ontario Power Company. Combining the figures for all each advances by the Province in respect of the total capital investment of the Greater Riagara System, it would appear that about 70% of the total capital investment is being repaid on a thirty-year or forty-year sinking fund basis.

Greater Niagara System will be represented by bonds issued or assumed by the Commission, all guaranteed by the Province with the exception of the Special Bonds of the Electrical Development Company and the 5, First Mortgage Bonds of the Toronto Power Company amounting to \$8,264,700, which were assumed by the Commission but not guaranteed by the Province.

decided upon in connection with the establishment of sinking funds in respect of these bonds. In respect of two issues, vis: the forty-year, 4% bonds of the Commission issued in connection with the acquisition of the Gutario Power Company (\$5,000.00) and the 4½% Consolidated Debenture Stock of the Toronto Power Company (\$12,383,831). sinking funds are being set up, or are required to be paid, in amounts sufficient to retire the obligations at maturity. With respect to the latter issue, the Commission proposes to repay this sum on a forty-year

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the annual payments of approximately \$300,000 per year, required to be paid to the trustees of the issue under the bond covenant. With regard to the remaining issues, the following table shows the approximate amount of sinking fund which will be accumulated at maturity of the bonds, together with the amounts that will be required to be refunded on the basis outlined in the preceding summary on pages 66, 67, 68 and 69:

CC	Amount Outstanding at October	Approximate amount of Sinking Fund accumulations to maturity of Bonds.	Balance not Provided for by Sinking Fund
(1) Ontario Power Company lat Mortgage 5% Bonds maturing in 1943	\$9,092,000	\$2,901,547	\$6,190,453
(2) Onterio Transmission Company 1st Mortgage 5% Bonds maturing in 1945	1,599,000	596,229	1,002,771
(3) Hydro-Electric Power Commission 20-year 6% Bonds of the Commission issu July lat, 1921, to retire bonds of the Ontario Power Com- pany		952, 990	response of the content of the conte
Carried Forward 3	13,891,000	\$4,450,674	\$9,440,526

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Toronto Power Company 10-year 5% Mortgage Bonds due July lat. 1924 COPT 5.92 (6) Mydro-Electric Power Commission 20-year 6% Bonds of the Commission due December 1st. 1940. issued in connection with the acquisition of the Toronte Power	
Electrical Development Company 1st Nortgage 55 50- year Gold Bonds due March 1st. 1933 4.161,500 708.820 3.48 (5) Toronto Power Company 10-year 55 Mortgage Bonds due July 1st. 1924 COPINS.200 167.171 5.93 (6) Hydro-Electric Power Commission 20-year 65 Bonds of the Commission due December 1st. 1940. issued in connection with the acquisition of the Toronto Power	iaca by
Electrical Development Company 1st Hortgage 55 50- year Gold Bonds due Harch 1st, 1953 4,161,500 708,820 3,48 (5) Toronto Power Company 10-year 55 Hortgage Bonds due July 1st, 1924 COPINS,200 167,171 3,93 (6) Hydro-Electric Power Commission 20-year 65 Bonds of the Commission due December 1st, 1940, issued in connection with the acquisition of the Toronto Power	
Electrical Development Company let Nortgage 55 50- year Gold Bonds due Norch 1st. 1953 4.161,500 708.820 3.48 (5) Toronto Power Company 10-year 55 Nortgage Bonds due July 1st. 1924 COPANOS.200 167.171 3.93 (6) Rydro-Electric Power Commission 20-year 65 Bonds of the Commission due December 1st. 1940. issued in connection with the acquisition of the Toronte Power	10,32
Electrical Development Company lat Nortgage 5% 50- year Gold Bonds due Norch lat. 1953 4.161,500 708.820 3.48 (5) Toronto Power Company lo-year 5% Nortgage Bonds due July lat. l924 COPANOS,200 167.171 3.93 (6) Hydro-Electric Power Commission 20-year 6% Bonds of the Commission due December lat. 1940. issued in connection with the acquisition of the Toronte Power	
1st Nortgage 5% 50- year Gold Bonds due North 1st, 1933 4,161,560 708,820 3,48 (5) Toronto Power Company 10-year 5% Nortgage Bonds due July 1st, 1924 COP 103,200 167,171 3,93 (6) Hydro-Ricotric Power Commission 20-year 6% Bonds of the Commission due December 1st, 1940, issued in connection with the acquisition of the Toronto Power	
Toronto Power Company 10-year 5% Nortgage Bonds due July lat, 1924 COPTOS,200 167,171 5,92 (6) Hydro-Electric Power Commission 20-year 6% Bonds of the Commission due December lat, 1940, issued in connection with the acquisition of the Toronte Power	63,280
Toronto Power Company 10-year 5% Mortgage Bonds due July lat. 1924 COPT 5,200 167,171 3,93 (6) Eydro-Electric Fower Commission 20-year 6% Bonds of the Commission due December lat. 1940, issued in connection with the acquisition of the Toronte Fower	
(6) Eydro-Electric Power Commission 20-year 6% Bonds of the Commission due December lat. 1940. issued in connection with the acquisition of the Toronto Fower	36,02
the Commission due December lat, 1940, issued in connection with the acquisition of the Toronto Tower	
issued in connection with the acquisition of the Toronto Fower	
of the Toronto Power	
The state of the s	
は、	5.45
\$22,774,700 \$5,519,607 \$17,25	55.09

The foregoing table is based on the following

accumptions:

- (a) Sinking Fund provisions in respect of (1) and (2) started November 1st, 1922, in respect of (3; and (5) at date of issue and in respect of (4) and (5) on December 1st, 1920.
 - (b) All calculations have been based on the sinking fund earning 4% per annum.

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In examining these figures, it will be observed that of the bonded indebtedness of \$22,774,700 made up of various amounts, maturing at different dates, only \$5.519.697 or less than 25% of the total amount of these outstanding bonds will be refunded by sinking fund acquaulations at maturity. It is not the intention to suggest in this connection that the Commission is under any obligation to provide sinking fund sufficient to retire these bond is sues at maturity; it is morely intended to show the extent to which sinking funds will be set up in the event of the adoption of the bases outlined in the dummary, and the extent to which refinancing will be meessary. The payment of all these bonds, with the exception of the two issues amounting to \$8,264,700 heretofers referred to, was guaranteed by the Province, and they are included in the balance sheet of the Province as an indirect limbility.

Olarkson, the Commission has always contended that the guarantee of bonds of the Commission or the guarantee of the payment of bonds assumed by the Commission, by the Province, is not an "advance" within the meaning of the Power Commission act, and that accordingly the Commission is not required to adhere to the sinking fund basis set out in Section 25 of the Act. Then the Province advances each for the purposes of the Commission

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it normally has to berrow the money on the security of its own bonds. If there is any essential difference between the liability of the Province in respect of its own bonds and its liability in respect of bonds is med or assumed by the Commission, payment of which is guaranteed by the Province. it would appear that the Province is in a fortunate position with regard to the capital investment in the Greater Missara bystem. insemuch as only 67% of that capital investment is represented by cash advances from the Province. In the last analysis, however, the guarantee of bonds by the Province is a liability just as direct and just as real as its liability in respect of its own bond is weed in the event of default in the payment of principal or interest in respect of the bonds, payment of which is guaranteed, there is no doubt that the bond holder would look for payment directly to the Province for satisfaction of his claim. Indeed the section of the Act under which the bonds of the Commission are guaranteed by the Province authorizes the Lieutenent-Covernor in Council "to make arran ements for supplying the money necessary to fulfil the reevirement of the said guarantee or guarantees, and to advance the amount necessary for that purpose out of the public funds of the Province". The value of the Provincial guarantee is evidenced by the fact that the Commission has requested the Province to guarantee each and every bond issue is med by it in connection with its power undertakings.

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parod a table with respect of the sinking fund accumulations to repay the expenditure upon the works of the Greater Misgara System more complete than the tables heretofore quoted. This table is set out in full on pages 77, 76 and 79.

This table demonstrates that, on the assumptions outlined therein, instead of the total capital investment being repaid at the end of a thirty-five-pear period, only \$96.409.816 will be accumulated within that period and that the balance of \$38,975,440 will have to be provided thereafter.

According to the computations of this Commission's Accountants, the Came Pameunts collected in respect of sinking fund from municipalities on the Greater Riagars eyetem on the capital investment as at October Elst, 1922, on the forty-year basis, or other bases employed or proposed as set out in the summary on pages 66, 67, 68 and 69 will amount to \$1,626,449; whereas, if the total capital investment were being repaid over the thirty-five-year period contemplated by the Power Commission act, the annual provision on the capital investment as at October Elst, 1922, would amount to \$2,436,300.

The interest of the Province on the one hand and the municipalities on the other are represented by the figures commented upon in the two preceding paragraphs. On the one hand, the Province, instead of being relieved of its liability in respect of its investment in the system at the end of the

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The figures set forth in Column (2) were btained from the accounts of the Spiro-Rectric Power Commission. The figures in Columns (4) to (6) inclusive are calculated on the bases of Solumn (1)

		(1)	(8)	(8)	(4)	(5)	(6)
Farticulars	Salunt as at Coober 51, 122	Similing Fund Basia	Amount of Staiding Fund consulated of Sotaber 31, 1922, our of Tower Changes	mual revision investment at Oct On 30-year basis using au- mual provision of 1-85 of cap- ital invested		Sinking Fund accommittee at the end of 35 years on basis of Column (4)	Balance to be provided after expiration of 35-ye r period
Cash advanced by the Frowince to the Cormission and expended on lines, stations, etc., of the Fingura System	₹21,72,650.00	Sinking Fund charges deforred for five years. Sinking Fund to be accommissed out of charges to manici whites for move during next ensuing thirty years, as pur Forms Commission Act.	\$1,562,904.51	\$ 590,939.3 0	\$ 290,929.30	∉£1.718,850.00	none
impurit expended in commection with the construction of the security with the construction of the security with the construction of the security with the construction of the construction	61442,615.00	Sinking Fund charges under Hingara Development -ot which does not name specific period. However, the Com- mission used a 40-year hads with a 5-year deforment period in sub-	Home	1,101,567.07	690,757.23	38,741,077.80	-26,901,857.20
Outstanding bonds of the Outsrio Fower Company and the Ontario Transmed soin Go., Life; cash advanced to the company by the Commission and bonds legand by the Commission and bonds legand by the Commission in commontion with the adjustitum of the Go. -First Mortague 50 Johns of the		mitting estimates to the Communiting Augments of the Enquiry Commission which has been used in this calculation. Amounts of v772,213 and v163,300 have been paid to the Trustee of the head issues of the Ontario Cower Co. und the Otherio Cornectiesion Co., iti, respectively, in accordance with the resultments of the					
Piret Mortgage 50 Bonds of the Transmission for any	9,092,300.00	bond overmints. These imposits name been taken to a large extent from removed Funds as no prevision for sinking fund in respect of these bonds has been included in oper- sting expuses. Inasmoh as the	Equa	165_656×00	25,672.00	5,866,180.97	3,725,849.0S
neturing in 1945	1,599,000	oting expenses. Inserted in the Other's Journ's Journ's Journ's Journ's Allen's to be analysed to the previsions of the Other's Journ's Journ'	Rome	26,762-93	16,827.00	945,741-28	655,256.72
Porward	\$98,052,465.00		31.302.984.51	91.764.944.57	\$1,194,202.55	\$66,769,820.05	2000 000 000

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		(1)	(2)	(5)	(4)	(8)	(6)
Particulars	Salance as at Outobor 31. 1922	Sinking Fund Apais	binking Fund squantated to Jabbar 31, 1922, ent ef Power Charges	ommal rovision investment at Oct. On 30-year basis using as- mal provision of 1-20 of cap- ital invested		Sinking Fund socumulation at end of 35 years en basis of Column (A)	Selame to be provided efter emiration of 35-year period
Carried Forward	\$98,052,465.00		\$1,502,984.51	\$1,764,944.37	\$1,194,208.55	\$46,769,820.05	‡31,282,644.95
Cash advanced by the Commission to the Power Commany for the purpose of constructing the Third Pipe Lime	3,514,677.00	Sinking Fund being accumulated on thirty-year basis with mo deferment period	241,546.92	62,667.00	62,667.09	(a. 8,514,677.00	Rone
Forty-year 46 Debentures maturing sugart 1, 1987, insued by the Constitution in the acquisition of the capital stock of the Unterio Power Co.	8,000,000	Sinking fund charges started in 1922 on basis sufficient to retire debentures at maturity (approximately 37-year basis)	204.000.00	144,900.00	100,000.00	(b) 6,270,147.00	1,729,855.00
County-year of debeniuses maturing July 1, 1941, issued by the Commission to retire bonds of the Fower Company which matured in 1921	\$ ₉ 200 ₉ 000.00	Simbing fund charges started July 1, 1921, on basis of m cannal charge of 10 of the issue (apprenticately dieyear basis)	32,000-00	57,600.00	88 ₈ 000.00	% ₉ 356 ₁ 372.06	843,128.96
Cutatunding house of the Toronto Power Company and bonds lessed by the Commission in the acqui- cition of the properties acquired in the se-called "Olem- up Deal":		load coverant re wires an annual					
Wirst Martage 30-year gold bonds of the Steatrical Sevelop- ment we, secured under trust deed with the National Trust Company maturing May 1,1941. (Whiting Stud based on bonds outstanding at Jacomber 1, 1980 in the espent of		payment to the Eventee of \$1.00 per horse-power gunerated and sold in the preceding year. The -coountent of the consistent has used a 40-year basis in preparing the 1922 accounts which has been exployed in this calculation.					
(4,585,0)0.)	4,261,500.10		(0) 86,910.84	78,050.00	46,517.50	3,352,464.92	982,535.08

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		(I)	(2)	(3)	(4)	(III)	(6)
Dark lessions	Relance as at Untober 21, 1922.	Sinking Fund Sucio	Amount of Sinking Fund necumbered to wetcher 31, 1922, out of Power Charges	investment at Cot on 30-year basis using an-mad provision of 1-80 of capital invested		Sinking Fund accumulation at end of 36 years on basis of Column (4)	Belance to be provided afte excitation of 35-year period
Gerrial Forward	\$11.6,928,642.00		\$1,869,444.27	(2,107,241.57	\$1,434,307.05	\$82,265,980·01	\$84,858,161.99
Commoditated Communicated Departure Stock of the Toyonto Press Communication Section S	12,365,658-00	Beed coverent re-mires annual rep- ment of \$109,0)2-7-5 to freatese together with the full mount of interest on the issue. Interest spullable to retired detectures is to be added to sinking find and applied in the retirement of securities. The account of the Commission has used a 40-year basis in propering the 1922 accounts which has been used in this calculation.	(e) 278,795-40	266,050.50	142,500-6R	10,485,764.92	3,075,D2,08
the Toronto Jover Concery secured by preference stock of the Toronton Personal Company Company under trust deed - maturing July 1, 1924	4,205,200.00	The Accountant of the Commission has used a 40-year hadis in propuring the 1282 accounts which has sen used in this calculation	(e) 84,156.63	75,857.00	45,189-00	8,380,808.86	101 (887 A)
Denty-year & Wahambures of the Commission due -ecenter 1,1940, issued in econocitin with the cajulation of the Terembo Fower Company	629,000.00	A 40-year basis has been used by the soccurtant of the Commission in preparing the 1922 soccurts of the Cornte Fewer Company and it has been used in this emboulation.	(c) 12,695.24	11,142.03	6,514-00	479,770.56	259,229.44
20242	3154,034,674.00		\$2,244,589.5 4	42,436,500.87	(2,626,449.65	\$96,409,81B.35	\$30,975,440.6

HTTE - (a) Astend assumulation at the end of thirtieth year.

(b) "estend assumulation at end of thirty-assumd year (three-year deferment taken)

(c) We understand that these assumes have yeb to be substituted to the Commission for approval.

(d) The calculations have all been made upon the basis of the sinking fund earning 4 per cent. per assum-

thirty-five-year period, will still remain directly or indirectly liable to an amount in excess of \$37,000,000; on the
other hand, instead of paying \$2,436,300 annually in respect
of sinking fund, the municipalities are only paying \$1,686,449,
and, whereas under the general provisions of the Power Commission act they would acquire an unoncumbered title to the
works serving them within thirty-five years, hey will, as a
matter of fact, be required to continue sinking fund payments
for a further ten years.

Ontario Hisgara Development Act. 1917, by the Commission, which has given rise to the Pana tion with respect to the sinking funds of the Greater Hisgara System heretofore described, vitally affects the interests of the Province. The Province is in the anomalous position of being the creditor of the Commission and the municipalities in respect of the Greater Hisgara System to an amount exceeding \$100,000,000, while the terms of repayment are left wholly in the hands of the debter, i.e., the Commission and municipalities. The Province has assumed full responsibility and relinquished all direct control over an undertaking in which it has pledged its credit to an amount representing almost half of the Provincial debt.

oircumstances in which the present situation has come to pass.

Up until 1914 the two principal elements represented in the cost of power, namely, interest and sinking fund, were definitely

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fixed by the Power Commission act. For example, according to the estimates submitted by the Commission to our Consulting Engineers with respect to the combined operation of the plants at Niagara Falls, interest will represent about 69% and sinking fund about 13% of the total cost of power at Hiagara Falls. Under Section 23 sinking funds were definitely on a thirty-year basis and the rate of interest was fixed at 4%. Up until this time, therefore, the Commission was in a position to estimate its capital expenditures and therefrom the cost of power to the municipalities with reasonable accuracy.

In 1915, the Province found that money was costing more than 4%, and to be a mended to require the aunicipalities through the Commission to pay the actual cost of money. The rate, however, was not increased during 1915 and 1916, but in 1917, 5% was applied on all advances from Bovember 1st, 1914, to Bovember 1st, 1917. Thus the cost of money was increased 25% resulting in an increase in the cost of power.

In 1917, when the queenston-Chippawa Power Development was initiated, special legislation, viz., the Ontario Niagara Development Act, 1917, was enacted. In anticipation of the heavy capital investment in the Greater Niagara System, which in 1922 represented 85% of the capital investment in all power undertakings of the Commission, the Commission claims that the Legislature intended by the enactment of Section 5 of this special Act to leave to the discretion of the Commission the

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cas solinates submitted by the Commission to our Committee grace glance with respect to the contined epocation of the glance by Mingare Walle, interest will represent about 60% and luting fund about 18% of the forel about of pewer at Mingare aller of the Cole Walle, Guder Section 25 similar funds were definitely on a linguist basis and the rate of interest was fixed at the cole of the Commission can in a continue to section the capital this time, the contere, the Commission can in a

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nore then ell and the constraint to pay the actual cost of the strong the Constraint to pay the actual cost of the strong the Constraint to pay the actual cost of and the strong little and the strong little actual on all advances from Hovert-

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constructed or acquired under that act. Whatever the legal merits of such a contention may be the manner in which the authority so claimed has been employed is amply demonstrated in the preceding pages. Obviously, the circet effect of prolonging the sinking fund period has been to decrease the annual cost of power to the municipalities, but, viewed from another angle, the discretion so granted has made it possible for the Commission to make actual costs correspond with estimated costs, thus effecting in whole or in part the uncertainty resulting from the 1916 amendment requiring the Commission to pay the cost of money instead of a flat interest rate of 4%.

the completion of the queenston-Chippaws Power Development and the expiration of deferment periods, benefit from the extended sinking fund periods fixed by the Commission to the extent of almost \$800,000 annually. Owing to the complications involved, it is impossible to compute with even reasonable accuracy the extent to which the annual cost per horse-power to municipalities on the Greater Misgara System would be increased if the sinking funds had all been established on the thirty-year basis contemplated by the Power Commission Act.

if there is one outstanding general complaint which has been repeated again and again to this Ocanission in the course of its public hearings throughout the Province, it is

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complaint that municipalities on the Niegara System are receiving power at much chesper rates than obtain elsewhere throughout the Province. It is obvious, of course, that municipalities within the geographical district served by Risgara Falls should, on the whole, receive power on a cost basic at considerably lower rates then obtain classhers throughout the Province. The Hydro movement had its birth in mid-western Ontario. All the development plants at Hiagara Falls, with the exception of the Queenston-Chippswa Power Development, wore in the main built a decade ago when construction and money costs were on a pre-war basis. Up until 1917 the dommission was able to with is a large block of power at Niagara Falls at less than \$10.00 per horse-power. Moreover, inasmuch as the district served by the system is the most densely populated in the Province and includes the vast majority of the potential industrial power loads, transmission costs are comparatively low. Altogether one would expect the cost of power to be lower in the Miagara district than elsewhere throughout the Province . Spence and the Partner Library solves and predicted

with which the municipalities on the Misgara System are endowed, the special treatment purported to be authorized by the Cutario Misgara Development Act. 1917, would appear to amount to real discrimination. Under the present scheme of the Power Commission Act. power is sold "at cost". The Legislature, therefore, cannot, without violating the principles upon which the

the complaint that municipalities on the Magnes system are would be in a labelly where the labelly a way and the same maintained -fant and the property of a contract the contract of PROPERTY OF THE PROPERTY AND ADDRESS OF THE PARTY AND ADDRESS. the oldest true is no manage ordered and on an although filled east develop have runge than algigle address sevel glieval glieval as resident the right and had been resemble to discover NAME OF TAXABLE PARTIES OF PARTIES OF TAXABLE PARTIES. AND ADDRESS OF TAXABLE PARTIES. completely speak or aveil to consider a property of the last and reason and int principles and against a distributed at the call of execution -DED HAT TAKE STORE BY ... BY STREET SHOPE OF BY AND RESERVES. ATTORNEY TO SEVEN SE MARKET SPACE IS SEALINED BY A FALSE AND ADJUSTED departed a party term of the party of the pa -very plantage case of at macro sale ad access, helverly, mit as self to private they self a platford and desired self-self-desired sense and admin duly districts and an army Labert and Tallengers marie to your all freque Plate and Godjeposth well playinging to be lived to be the standard of the standard a cognie o The angle

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Hydro movement was founded, attempt by legislation to equalize power rates throughout the Province. It cannot counteract the natural advantages obtaining in the Niagara district, and it can defend any charge of discrimination which may be laid in that connection. On the other hand, the Legislature and the Commission have absolute central over the additional artificial advantage conferred upon the municipalities of the Hiagara System by the Ontario Hiagara Development Act, 1917, and it would appear difficult to defend a charge of discrimination in that connection. With every other municipality throughout the Province, except the dity of Port arthur, required to repay its proportion of the cost of works serving it within a thirty-five-year period, it does a pear to be special treatment of a very discriminatory character to extend to the prosperous municipalities on the Risgara System the benefit of extended sinking fund pariods.

equalization of power rates throughout the Province would violate the scheme of the Power Commission act, and the principles upon which the Hyaro movement was founded. The pondulum would seem, however, to have swung a long way in the opposite direction with similar results. The extension of the sinking fund periods in connection with the capital investment in the Hiagara System has destroyed two fundamental principles under which the Hyaro movement in Ontario was initiated and

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developed. The principle that "power is supplied at cost on an equal basis to all" has gone into the discard, and the popular belief that the municipalities will obtain a complete equity in all works serving them within thirty years is now only a myth.

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between the municipalities, the Commission and the Province in respect of the Greater Mingara bysion would be a simple matter if such relations had movely to be interpreted, as in the case of all other systems, in the light of the provisions of the Power Commission act. There is, however, in the Ontario Mingara Development act and the Ontario Mingara Development act. 1917, sometimes referred to as the "Development acts", special legisla to a Pa Vry important character affecting the general relations in respect of the works at Mingara Falls serving the district, comprised in the Mingara System, with power.

The Niagara System proper, i.e., the transmission
lines, transformer stations and their accessories, was conatructed under the provisions of the fewer Commission act, and
its operation would appear to be in no way affected by the socalled "Development Acts". The relations existing with
regard to these works is the normal relationship contemplated
by the Power Commission Act. The capital cost, some
\$21,695,000 as at October Slat. 1922, was financed by cash
advances by the Province to the Commission; the municipalities
are paying interest and sinking fund charges on the thirty-year

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 basis requires by Saction 25, annually; the Province is
receiving interest on its advances and the Commission is
year by year depositing Provincial securities, representing
the annual sinking fund accumulations with the Province of
Optario; and at the end of the thirty-five-year period the
Province will have been repaid its advances in full and the
municipalities will possess an unencumbered title to the works
comprised in the Hisgara System.

Is, in a sense, is the same category. The work as at October 31st, 1922, represents a cash investment of \$3.514.677. It was financed by each advances by the Previous in respect of which a sinking fund CaCh Prylyser basis with no deferment period has been established. It would appear that this sork is like-wise unaffected by the terms of the "Development acts".

general relations existing with respect to the works represented by the property formerly owned by the Ontario Power Company, the Toronto Power Company, and their subsidiaries, and the queenston-Chippava Power Development, the terms of the so-called "Development Acts" must be read with the general provisions of the Power Commission Act. The general relations with respect to the works of the Ontario Power Company are discussed in this Commission's report entitled "The Ontario Power Company of Piagara Palls". The relations with respect to the queenston-Chippawa Power Development are likewise described in a separate report. Although the acquisition of the works of the Terento

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Power Jos any is of too recent date to make a full description of the purchase and operation of these works possible, considerable information is included in the foregoing sections of this report. The general legal questions involved in the interpretation of the "Development Acts" will be discussed in a separate report. For the purposes of this report. It is sufficient to refer to the figures, data and comment contained in the preceding pages.

Relations with the Town of Dunnville

A deputation from Dunnville appeared before this Commission on sebruary 21st, 1923, their complaint, as stated by Mr. William Marakai I. S. Ang:

"The Hydro System was introduced in Dunaville in 1916 and 1917 to replace a privately owned system. The price quoted was \$27.77 per horse-power. That was understood to be the maximum figure and the price new is \$50.00 I think we are paying too much for power. \$27.77 is what the people understood was to be the price."

Ev. 3030

was first approached by a private citizen, Mr. George
Orme, in 1916. A resolution of the Municipal Council was
passed May 3rd, 1916, requesting the Commission to value the
privately-owned plant and distribution system which supplied Ev.
3042
Dunnville with power. A valuation was made and the Commission
advised the municipality to purchase the plant for \$10,000.00
and this was afterwards increased to \$15,000.00 and finally a
compromise was made at \$16,500.00. The local company had held

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A deputy tion from Planetillo appeared before this

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ELECTRIC INQUIRY COMMISSION

out for \$18,000.00, but agreed to accept the last mentioned figure.

A by-law was submitted on deptember 25th, 1916, to ascertain if the electors were "in favor of obtaining NV. from the Hydro-Electric Power Commission of Ontario a supply and the 3037 of electric power". The by-law was carried almost unanimously.3038

Prior to the submission of the by-law a representative of the Commission addressed a meeting in Dannville . the following is an extract from the evidence at the hearing:

- "Q. Have you got the estimates that were submitted to you?
- Mr. Marshall: There were no estimates.
- Q. How did you ar tvo at
- A. The Hydro arrived at that.
- d. Didn't they submit any estimates of the price at the time negotiations were taken up?
- A. It was just through a public mosting.
- q. They might have made statements at a public meeting?
- A. Yes, they did.
- who diar
- I do not know which one it One Mr. Jeffrey. was. J. J. Jeffrey.
- i. Mr. J. J. Jeffrey made that statement to you?
- A. You.
- Q. He came over there on behalf of the Hyaro?
- A. I suppose he came over there on behalf of Hydro. was not on the Commission at the time.

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- Er. Marsinll: The re were no estimates.
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- Q. At what stage was this statement made by Mr.
 Jeffrey; had you taken the vote them or after?
- A. The vote was after that.
- Q. When wee this?
 - A. It was in 1918 (sid) before the vote was taken. I do not know the date.
- 3 to Q. Can you tell, Mr. Jeffrey?
- Mr. J. J. Jeffrey: June 18th, 1918, and the voice was taken on September 26th. I also attended a public meeting on September 20th.
- C. You just attended two public meetings?
- Mr. Joffrey: Several other council meetings and at these particular times the rate and a lot of details were given."

3031

- "Hr. Camelford: we had one public meeting in the Opera
 House and Thompson addressed the Council
 at less twice. The people considered the cost
 of Hydro power would be \$27.77 on the basis of
 500 horse-power.
- Mr. Marshall: Of course I understood it would not be more than that and if we took more than 300 horse-power it would be less. The agreement mays that they agree to deliver 300 horse-power but it does not say the municipality must take it. Of course, the understanding was, as far as I know, that if we took over 500 horse-power it would be less and if we took less than 500 horse-power it would not be any more.

Commissioner Harris: What did you take?

A. There was a figure mentioned that if we took 400 horse-power the price would come down to \$21.30."

2v.

the cost of power or the cost to the municipality before the by-law was submitted to the people and no estimates were published with the by-law. Officials of the Commission Edvised

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ELECTRIC INQUIRY COMMISSION

that on the advice of legal counsel if the estimates were Charles for the party of the party of the last of the party of the last of the put in with a by-law the figures could in no wise be alterea. NAME AND ADDRESS OF THE OWNER, WHEN PERSON AND ADDRESS OF THE PARTY NAMED IN In other words, the price for power could in no way be varied from the prices submitted in the setimeter. A long ounext strained was a week a total and by married to planation of this was made by Mr. Jeffrey in which he pointed out how the rates for power are fixed by the Commission and how a municipality taking less power than estimated would in offect cause an increase in the price of power to the other municipalities on the same agatem.

He stated that the lowering of the load on any system affects every municipality on the system and while each municipality has to carry all of the fixed charges on a particular Crange stin line, where municipalities E.F. 3050 are connected on that line, the particular item of increased cost on the decrease in the load on the generating plant increases the cost of power to the other municipalities.

The following are extracts from the evidence:

- Mr. Joffrey: The rates given were for 200 herse-power 4.400 volts. 335.14 per horse-power: 300 horsepower \$27.77: 400 horse-power \$24.11: 500 horsepower dal. 90. These were figures given both at the Council and also at the public meeting.
- Mr. Marshall: I never heard that first figure of 335.14.
- Mr. J. J. Jeffrey: It was fully explained. These were estimated figures and would be adjusted annually to cost and were not to be considered definite figures.
- The Chairman: The Statute says you shall give an estimate of the maximum cost.
- Mr. J. J. Jeffrey: It is impossible to do that.

CONTRACT VARSEN DUTCH OF J 12, 51 27 producted and white his sale making derivative new world-had a name of the belver ed the seales where you belve edd and you artist a the priors submitted in the entimered, A long anno color of profitch and his name and next to distribute AND THE ROLL AND ADDRESS OF THE PARTY WHEN THE PARTY AND T and more and principlify the most have experient - 60 MANUAL PROPERTY AND PERSONS AN or years one has need and all properties and an enter he NAME AND ADDRESS OF THE PARTY O efficient and modele on the vertical course attenth a modele polynosis bandle and no fin sufficient about a new point in it is in the plant of the it was a se LES. AND RESIDENCE OF A STATE OF THE SAFEKS OF THE PARTY OF TH . India mairinement ada no paos oda ni esconom oda no . . . services and the service to down and binarial The sullenger of the su REPORT - CO TO THE WILL BE CONTROL OF THE PART OF THE THE RESERVE AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY. - paymed 60s ; if a wife warm - at a pal 60s at in that saving manager warm march affecting agency. and force an own add on or Co past Littered with · 排析於關 第 化基苯酚磺酸 。 the de de description of the same of the s of from the parties of these the named it derivatives THE PARTY OF THE P AP 107 10 11 ar are a linde mor arms winder . · Fra Committee Anna . ends ob os ofdinacomi at the

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ELECTRIC INQUIRY COMMISSION

- NAME AND ADDRESS OF PARTY OF PERSON ASSESSED. The Chairman: in this letter to the Council dated august Eith signed by Mr. Gaby it says: "It will not be necessary to publish the contract and estimates of this Commission in connection with the supply of power to your municipality"?
- se are advised not, we are advised by counsel it A 4 is not necessary.
- was that Mr. Hellmuth's opinion? Q .
- Yes, that is a legal matter and I was merely follow-A. ing the instructions. That is the instructions we gave to all municipalities.
- Commissioner Haney: In other words it was considered undesirable to publish the figures?
- TO SERVICE THE PROPERTY OF THE SERVICE Not undesirable.
- Commissioner Hanay: As Mr. Hellmuth's opinion said it would bind you to that price.
- Er. R. 2. Jo Gra P Wald not say undestrable, 1 would say impossible.
- To the Chairman:
- It would be impossible to publish it? Es m
- It would be impossible to follow the terms and conditions of the act if these prices were put in and we were natical down to these prices.
- age facilities of properties have properties and loss. Don't you think it is a good thing to nail people (ii) * down when you are making a contract? country their the party who produce the highly bear of the
- A. Absolutely.
- Thy won't you be nailed down as well as other people? 23.

No. American Str. sparts. Atomic or parties ...

- se are merely acting as Trustees.
- If a trustee makes a contract he is nailed down the same as any other person?
- A. No. It is their contract and we are merely acting as Prustees to give them powers:
- 1. You make a great many contracts in which you are bound?

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- we make them under concitions as fixed in the act. If we had to make contracts like that we would make them high enough so that they would be all right.
- Don't you think that would be a good thing to do, so that the municipalities would be sure?
- A. If we did it would be impossible for the scheme to exist, it could not be done.
- Because we could not reduce rates.
- You could make them as much lower as you liked and you could say the maximum would be so much, that is what the act says, you are to give the maximum rate?
- It does not say so, if we put it right in the contract we would have to charge that rate.
- 4. Don't you think it would be a good thing to put in the maximum rate so that municipalities might know the limit to wajoh you could go in raising the rates when they eathe layofa centract with you. If they give you the right to raise the rates as high as you like you might run it up two or three times and the rates they would have to pay would be altogether different from what they had in their minds?

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A. If conditions vary the rate must be changed.

and lakers

Mr. R. T. Jeffrey: If we had to furnish the maximum price and stick right with that particular section of the Act, the scheme would never go ahead because in many cases we would have to put the price so high that they Ev. would never take it. We have to give them a price.

3058

The actual rates charged the tewn of Dunnville

are he follows:

Zoor " "	Lond	Rate
1919	194.3 h.p.	\$40.76
1920	236.9 h.p.	41.73
1921	261.1 h.p.	41.21
1922	296.3 h.p.	37.26

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at the hearing, Mr. Jeffrey said:

"At the early part of the contract Dunnville had not a very big load and power was costing over \$100 per horse-power and they were paying at the rate of \$27.77 and the deficits that have account have piled up and they are now senething like \$7.700 and there is \$2.600 to come off that and possibly another \$300 en account of the little depreciation on the whole system every year. Duanville is in good shape financially, they have been using their surplus on the local system to build instead of issuing debentures, and that is quite right but they had this amount outstanding which they could have paid out of the surplus if they had not used it as they have done. If they is sue debentures for an amount sufficient to wipe that out immediately their cost would drop to about \$40.

Ev. 3082 3683

plant was taken over and the Commission undertook the construction of a Charp Mission to Dunnville. The original estimate of the cost of this line was \$33,000.70, but the actual cost was \$65,340.21. The explanation of the difference in cost from the estimates was given by Er. Jeffrey as follower

"The original line was estimated on the basis of a pin type line to carry 46.000 volts. That was on the basis of 1915 conditions. We made this estimate in april 27th, 1916, on the basis of the actual cost of labour and material in 1915."

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"After the estimate was made the war came on and the leads began to grow on our Riagara system so fast that we had to buy the Onterio Power Company. Then in 1915 we had made a contract with the Canadian Riagara Power Company and later, before the line was constructed, we made a contract to buy power from the Forento Biagara Power Company, about 50,000 horse-power."

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"The engineers decided before this line was built that it would be unsafe to tie in a pin type line at that voltage on to the other lines running out of Mizgara Falls, so close to the generating plant. The loads in welland we'e not big prior to the fall of 1916 but they more than doubled between these two periods."

BT. 3065

"For that reason it was decided to change over from a pin type line to a suspension insulator line as the engineers thought that would give a higher factor of safety and would lesson the liability to short circuit and the earger of serious damage to the plant. .. figured at that time that the change in the line from the pin type to the suspension type would cost approximately \$17,000 and that of course would increase the cost of the power to Dunaville, and I suppose we should have gone to Dunnville and resubmitted the matter and told them that we had to change the type of line and that would increase the cost of power to them."

Sw. 3063 3084

The difference in the cost as given by Mr.

Jeffrey is as follows:

Change in pover 1) as meter tal Change due to changed denditions

\$14,005.21 2,705.70

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Labour and Board additional costs Proceed to the state of the state of \$16,760.91 14.869.62

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The item of \$14,869.62 increase in the cost of labour is made up as follows:

Increase due to change in type of line \$5,665.54

8.204.08

AL W. 3066

Increase due to lack of efficiency and increased rates of pay

\$14.869.62

as this was a new type of line and in the nature of an engineering experiment the matter was taken up by the Commission and \$10,000 of the capital cost of the line was I Wa charged to contingencies over the whole Niagara Jystem,

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instead of against Dunnville alone.

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SUMMARY

is somewhat different in form to that adopted for other systems.

The first two sections of the report namely "Misterical Sketch" and "Physical" follow very closely the general lines used in other system reports, but in respect of sections dealing with "General Economics", it has been deemed advisable to divide the discussion into two sections. Section No. 1 deals with the operation of the "Misgara System Proper" and consequently does not include the development plants which supply energy to the transmission lines of the System. Section No. 2 of "General Economics", being that portion of the report comprising pages 54 to 85 deals with conditions assuming that the development plants at Misgara are a part of the Misgara System, resulting in what may be termed the "Greater Misgara System".

to propare a Summary covering all the important features. In this case, however, the system described is so important and the facts so complicated, especially those contained in "General Sconemics, Section # 2", that the Summary serves only to select the most important features. These features can be properly understood only after a study of the report proper.

In summarizing the operation of the "Niagara System Proper", it is pointed out that the Commission has with one or

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two minor exceptions adhered to the provisions of the Power Commission Act. There are a number of cases where municipalities are in default of payment of their power bills, deficits having been incurred by them subsequent to the three-year deferment period permitted by the act. With respect to rural lines operated at the risk of the Commission, while these over the whole period of operation show a surplus, during each of the four years of the period ending October Slat. 1921, small losses were incurred. Insofar as the operating economics of the system are concerned, a study of the accounts show that the contingency reserve is such too low and the amount to the credit of this reserve at the end of October Slat, 1971, cosponsiderably lower than the yearly requirements. This reserve should undoubtedly be built up to much greater preportions in order to fully provide a sum to meet such losses. It is also important to note that very substantial reductions have been made in the renewal reserve rate from time to In analyzing this matter our Consulting Engineer points out that up to October 31st. 1921, the amount provided appeared to be quite adequate. Since that date, however, the Commission has reduced the rate by 50% making the revised rate effective as from October 31st, 1921. This reduction in the renewal rate has materially reduced power costs for the fiscal year 1922. If the reduction in renewal reserve was justified it would appear more proper to credit at least part of the funds to the contingency reserve rather than to apply the whole amount to the reduction of power costs.

It is difficult to summarize in a satisfactory manner

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symptom the expension to it by a by a because in a process in all all

the conditions disclosed by Section # 2. "General Sconomics".

Conorally it may be stated, however, that two outstanding principles have always been recognized as applying to the power undertakings of the Commission. These are as follows:

- 1. That power is sold at cost on an equal basis to all municipalities irrespective of the system to which they belong.
- 2. That the municipalities acquire a complete equity in all works of the Commission in a thirty-year period.

to the "Greater Biagara Lystem" and that by reason of special legislation and the right of the Commission to own and operate companies the municipalities in this system are in a very favoured condition as compared The the municipalities in other systems.

There appears to be no just reason why this discrimination should exist in a union of municipalities such as that contemplated by the Power Commission Act. Insofar as the repayment of cash advances from the Province is concerned, all systems should be placed on the same basis. If a thirty-year repayment period is considered proper, then it should apply to the works of the Biagara System as it does to the works of other systems. If, on the other hand, a forty-year period is the one decided upon, then the accounts of the systems on the thirty-year basis should be adjusted to bring them into conformity with this period of repayment.

Insofar as sinking funds for the retirement of outstanding bonds are concerned, our study of this matter shows that the Commission has adopted no well defined or consistent policy 135-3F

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where he reserved or old one thank and substitute of testinal THE PERSON OF PARTY AND PERSONS AND PERSON the Found sales has earlied in a call saling or checken and my sale from the in this respect. In some cases no retirement fund is being provided, and where such a fund is being provided, it bears no relationship to the amount that will be required at the maturity of the bonds, thus leaving it necessary for refunding loans to be issued as the bonds outstanding become due.

consider such outstanding bond issues in the came way as each advances, and that they be required to provide yearly sinking fund amounts which at the end of a fixed period would equal the total amount of the bonds outstanding. Many of the bonds run for comparatively short periods, and the maturity date of others extends to periods of thirty or forty years. It is apparent, therefore, that indiapfund in respect of the bond issues may be more or less than the amount required when the various bonds fall due. The fund could, however, be used to the extent it is available at the time it is required, the balance being provided for by additional loans, which in turn would carry their proper sinking fund provisions.

the Greater Riagara System and all other systems being administered by the Commission is the relationship that exists between the Commission and the Province in respect of development works at Miagara. If the proposals outlined above are put into effect, much will be accomplished in safeguarding the interests of the Province in respect of companies operated by the Commission, the bonds of which are guaranteed by the Province.

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